

NIGHT LIFE in BELLINGHAM 1 1 1 The new unbleached sulphite pulp mill of the PUGET SOUND PULP & TIMBER CO. is producing at maximum capacity as is the entire Pacific Coast pulp industry.



In this mill at Longview, Washington, the Pulp Division of the Weyer-haeuser Timber Company produces approximately 200 tons of high quality bleached sulphite pulp per day.

This operation is outstanding, not only for the quality of the pulp, but for the thoroughness with which all factors affecting quality are recorded and controlled. It is significant that, in its Longview Mill, the Weyerhaeuser Timber Company uses liquid chlorine and caustic soda produced by the Pennsylvania Salt Manufacturing Company. In your mill, also, the high and uniform quality of these chemicals, plus speedy deliveries in any quantity, will prove to be of value.

A few of the Pennsylvania Salt Manufacturing Company Products:

CHLORINE

PENNPAINT

AMMONIA

CALCIUM HYPOCHLORITE
ASPLIT CEMENT

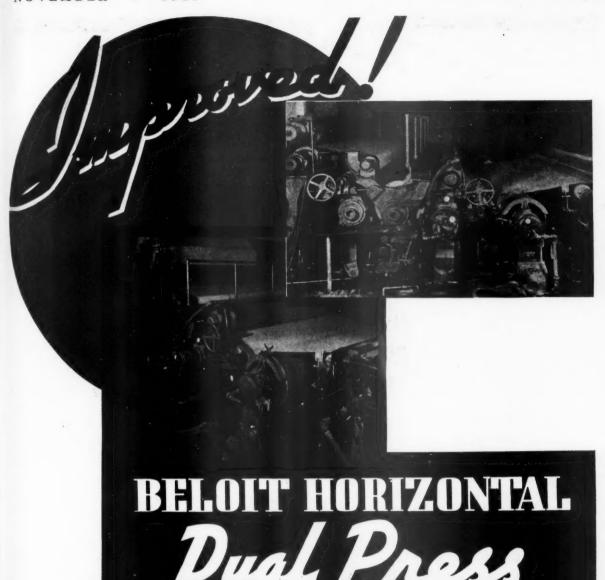
PENCHLOR ACID-PROOF CEMENT CAUSTIC SODA

PENNSYLVANIA SALT



MANUFACTURING CO. OF WASHINGTON

TACOMA, WASHINGTON



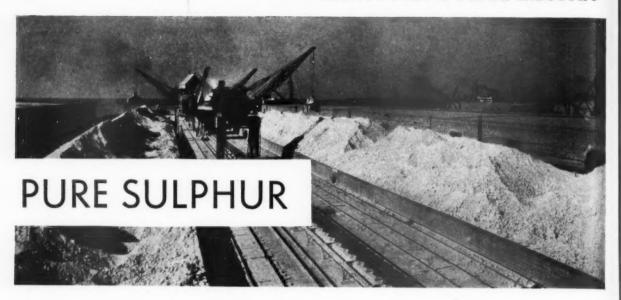
- The Beloit Horizontal Dual Press has been improved by incorporating a primary roll over the first suction press, adding another nip. Thus, this press is now equivalent to three presses instead of two, the first suction roll doing double duty.
- The success of the Beloit Horizontal Dual Press has been definitely established. This new press gives even better results.

THE BELOIT WAY



IS THE MODERN WAY

BELOIT IRON WORKS BELOIT



# New and Interesting Facts about This Versatile Element



How many realize that Sulphur has excellent insulating properties? Note, for example, its relative position in the following table of thermal conductivities (B.t.u./hr./sq. ft./°F./in.):

Corkboard	0.32
Sawdust	1.04
Sulphur impregnated poplar	1.00
Sulphur	1.72-2.00
Asbestos Wood	2.70
Red brick	4.35
Concrete, stone	8.30

Sulphur has been used as the insulating material in common household containers for keeping foods hot or cold. Its imperviousness to moisture is advantageous, too, when used in this manner.



Sulphur has many other interesting properties that suggest other new and novel uses.



## A FELT PROBLEM?

Possibly you are making a new grade of paper. Possibly you are not getting the felt life, the finish, or the water removal required to meet competitive conditions on an established grade of product. In any of these cases you may have a felt problem. You can struggle along making compromises here and there, or even change your source of felt supply and still not have the answer. No one type of felt will meet equally well all different conditions. But there is a way to solve that problem.

## LET HUYCK HELP YOU

Call in the Huyck representative in your territory. He has the training and experience to analyze your machine conditions, determine the type of felt you need. F. C. Huyck & Sons have specialized in building custom-made felts to meet individual requirements. Huyck's representatives and field engineers are available at all times. And their service is free for the asking. So if you have a felt problem, don't worry with it. Let a Huyck man help you.

Pacific Coast Representatives PACIFIC COAST SUPPLY CO.

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### Pulp Imports Increased in September

Up 6.5% over August with Canada and Finland showing increases and Sweden and Norway decreases in shipments to the United States-October imports expected to give clearer picture of the import situation

MPORTS of wood pulp into the United States increased 6.5 per cent in September over August despite the war's interference with shipping. Preliminary import data released by the Forest Products Division of the Bureau of Foreign and Domestic Commerce, De-partment of Commerce shows that 160,partment or Commerce shows that 160,-417 short tons of wood pulp valued at \$5,880,141 came into the United States in September. Although this was 6.5 per cent larger than the August imports it was 1.6 per cent less than the imports in September, 1938.

• The increase in the total imports was due to a 52 per cent increase in imports from Canada, to 68,356 short tons, over the August imports from that country, and to a 14 per cent increase in imports from Finland which amounted to 33,641 short tons.

 Decreases were recorded in pulp imper cent from Sweden which declined 19 per cent from the August totals to 53,-724 short tons in September; and also in the imports from Norway which were down 42 per cent below August with 4202 cone 4,202 tons.

4,202 tons.

During September 49,145 tons of unbleached sulphite pulp were imported from the following countries: Finland, 13,417 short tons; Norway, 1,111 short tons; Sweden, 22,297 short tons; and Canada, 12,307 short tons.

In the same month bleached sulphite imports totaled 39,785 short tons of which Canada supplied 26,018 tons; Sweden, 3,217 tons; Finland, 7,531 tons, and Norway, 2,538 tons.

Norway, 2,538 tons.
September unbleached sulphate imports totaled 38,876 short tons of which Sweden supplied 22,111 tons; Finland, 8,963 tons; Canada, 7,249 tons, and Norway 553 tons.
Bleached sulphate imports amounted to 8,087 short tons of which Canada supplied 4,668 tons; Sweden, 2,795 tons, and Finland, 634 tons. All of the 950 tons of soda pulp imported during the tons of soda pulp imported during the month came from Canada.

Unbleached mechanical wood pulp imports aggregating 23,574 short tons, came chiefly from Canada, that country shipping 17,164 tons. Finland supplied 3,096 tons and Sweden sent 3,314 tons.

### Import Situation Still Uncertain

• As the saying goes, "one swallow doesn't make a summer," neither do the doesn't make a summer," neither do the imports in the first month of the war indicate what may be expected in the future. The pulp and paper industry of the United States was surprised at the large tonnages which found their way through mine and submarine infested waters to Atlantic Coast ports. It is generally believed that the October import figures available about November. import figures, available about November 25th, will give a truer picture of the pulp import situation as long as the war remains in its relatively inactive siege stage.
As yet we do not know what propor-

tion of the tonnage arriving from Fin-land, Norway and Sweden during Sep-tember was on the water and out of the war zone when war was declared on September 2nd. So far the Department of Commerce has not broken down the import figures to show the arrivals each day of September, so we can do no more than assume that considerable pulp was in the open Atlantic at the time hostilibegan.

If and when the war passes into a period of active fighting the shipping situation will probably change for the worse. All is still uncertainty.

### Prices Firm

 According to the best sources of in-formation, available prices being quoted on foreign pulp for fourth quarter delivery have not changed from the levels publicly quoted last summer, the difference being that these are now the ac-tual prices not just a front under which to cut if the circumstances warranted. This means that unbleached sulphite is selling at around \$40 delivered Atlantic ports and bleached sulphite at about \$50 ports and bleached sulphite at about \$50 per ton Atlantic ports. To these figures must be added additional freight and insurance caused by war conditions. These rates vary but apparently are not as high as at first thought, ranging from \$5.50 to \$7.50 per ton according to reports considered authentic.

### Buyers Prefer American and Canadian Pulp

 Although imports continued normally • Although imports continued normally in September the paper mill buyers throughout the country maintained a strong preference for American sources, first, and then Canadian sources, second. This is natural, arising out of the instinct of self-preservation. No one wants to be dependent upon Europe as a source of supply these days.
For the duration of the war at least, and we hope permanently, the situation is reversed, American pulp mills are now the primary source and foreign mills the

the primary source and foreign mills the secondary source of supply for domes-tic paper mills.

It is safe to say that practically all pulp mills now operating in this coun-try have contracts for their full capacity 1940. If some haven't sold out completely, it is not due to lack of offers but instead to their own decisions to withhold some tonnage for emergencies. No prices for 1940 deliveries have been made as yet but it is expected that the pulp mills will individually set prices for

mills will individually set prices for the first quarter sometime early in December. There has been no joint action taken on prices since the days of the NRA. Prices will be higher but not exhorbitant. They were too low during 1938 and 1939 even with some costs down. Now, with costs rising, particularly on wood, price increases are essential.

Higher prices on sulphite pulps were fully justified for the last quarter of 1939 by the great demand which sud-

denly developed, and the fact that they did not rise is a tribute to the desire on the part of American producers to cooperate with their domestic customers in helping them maintain a competitive position.

### The Swedish Viewpoint

· Sweden, too, is faced with higher costs as will be noted by the following state-ments taken from The Swedish Wood Pulp Journal for October 16th:

"Developments in the trade war be-tween Germany and Great Britain have rapidly become extremely devastating to the neutral countries. Germany, for in-stance, is not only seizing or sinking ships destinated to the belligerent countries, but have also stopped vessels carrying goods between neutral countries. The goods between neutral countries. The immediate result has been a further increase of the war risk premiums, and consequently also of the freights, which for certain qualities—especially wet mechanical pulp-are now almost pro-

hibitive.

"Not least a troublesome feature is that the rates to America have also risen steeply, which necessarily makes the pulp bought still more expensive to the consumers. It is easy to understand what this will mean, especially to our kraft pulp. The capacity of the American sulphate industry has been very largely increased in recent years, but owing to the depression in the latter half of 1937 and in 1938 a large proportion of the capacity of the new mills could not be utilized. Owing to certain circumctances, e.g., rapid-growing and easily accessible raw materials, the mills in the southern states can produce pulp under economically advantageous conditions, which gives them a very strong competitive position in relation to imported stuff. imported pulp must now bear the greatly increased freights, one may with some reason ask how far it will be possible to maintain the Swedish exports of sulphate pulp. It is also of interest to note that four more production units are now being planned in the southern states, although the capacity of the existing mills there has not yet been fully utilized. mills there has not yet been fully utilized. There is also important bleached sulphite and bleached sulphate industries on the continent of America, with which the importers of these qualities have to compete. In view of these circumstances, the maintenance of as low freights as possible to America seems to be a vital interst of the Swedish pulp industry. "The inflationary increase of prices

"The inflationary increase of prices already appearing in sereval of the American commodity markets has also to some extent affected pulp and paper of American manufacture, and this has so far made it possible to induce the buyers of imported cellulose to pay the higher freights. The Scandinavian man-ufacturers, however, will probably—as was mentioned in our last report—be compelled to ask for some compensation for their rising production costs, par-ticularly on account of the increased costs of coal and chemicals. We are informed that such compensation has in some cases already been agreed on.

### The Finnish Reaction

We quote from The Finnish Paper and Timber Journal dated September 30,

"During the five weeks which have elapsed since the war began the outlook for the Finnish export trade to England has grown decidedly gloomier. with, the exporters were mainly concerned with the mine danger in Danish waters. They were still hoping that the waters. They were still hoping that the bulk of the woodworking products would not be included in the contraband lists. But gradually, in one way or another, the number of prohibited articles in-creased, and at present only very few Finnish and Scandinavian products can be shipped to belligerent countries west of the Baltic without running the risk of being seized or sunk. Already the first attacks on Finnish vessels made it manifestly clear that the optimism prevailing during the first days of the war had no justification. Both in Finland and the Scandinavian countries the natural reaction took the form of heavily raised freight and insurance rates which gradually rose to a level prohibiting shipments sawn timber to the United Kingdom and temporarily causing a sharp drop in exports also to neutral countries. Shipments of other woodworking products to England also fell off substantially. "It has been held in Finland that the

increasing difficulties have been, partly, due to the fact that England has in some way regarded these commodities contraband. This has caused some surprise because it is known that such a measure does not at present harm Ger-man interests to any appreciable extent, while on the other hand, by calling forth German counter-measures, it increacosts carried by the British industries. it increases

"The German naval control has since grown still more severe. As far as the shipping to neutral countries is concerned, Finland, however, still considers the outlook as quite passable and, as the influx of orders from the neutral markets remains fairly satsifactory, it seems pos-sible to keep the mills so well occupied that there is at present no danger of serious unemployment in the woodworking industries.

### Rayonier Receives Large Japanese Order

• Further orders for rayon pulp from Japan were announced October 25th by Rayonier Incorporated, largest producer of dissolving pulps, with four mills in Washington and a fifth nearing com-pletion at Fernandina, Florida.

J. D. Zellerbach, executive vice-president of Rayonier, in making the announcement stated that the orders totaled 21,504 short tons for delivery between November 1st and February 15th, 1940. This order is the first to be received by

Rayonier from Japan since June when commitments totaling 16,800 short tons agreed upon for delivery between July 1st and December 31st. Approximately 3,800 short tons were shipped by July 31st when the Japanese requested that the entire order be shipped by October 31st. The new order follows directly upon the heels of the one completed at the end of October making a total of 38,300 short tons sold to Japan by Rayonier from July 1st, 1939, to February 15, 1940.

### Vernon to Install Two Shartle Beaker Systems

 The Vernon Division of the Fibre-board Products, Inc., will add to its beater room equipment two new Shartle Breaker Beaters of 120-ton capacity each.
The beaters will have all of the latest settling and stock cleaning devices and will shorten the length of the cycle in settling out the dirt.

rling out the dirt.
The beaters will be installed in Jan-iry. Some changes will be made in building to accommodate the new uary. the building to accommodate the new beaters, and they will be installed where the ink stock is kept now.

## West Linn to Have New Steam Plant

· A construction program designed to consolidate steam plant facilities of the West Linn paper mill into one large central steam plant was announced this week by Clarence E. Bruner, resident manager of Crown Willamette Paper Company division, Crown Zellerbach Corporation.

Orders have already been placed for the two new boilers. Plans call for the first boiler to be in use within ten months, the second to be

ready six months later.

"The new installation is necessary due to a number of the old boilers wearing out in service," said Mr. Bruner today. "For some years steam to operate the paper mill has been generated in seventeen boilers located in four different parts of the plant. When it was apparent that a number of these boilers would have to be replaced, it was decided to install two large boilers to operate from a central location, and

with capacity sufficient to operate all units of the paper mill.'

The new steam plant will be located on the site of the present Mill B. boiler house, adjoining the sulphite mill. One of the boilers will be equipped to burn waste fuel from the West Linn wood mill, which will be hogged and carried by belt over a suspension bridge to be constructed above the tail-race of the Portland Electric Power Company's plant between Mill A. and Mill B.

The two new Babcock & Wilcox boilers to be installed are of the integral furnace type of 250 pounds working pressure, each capable of developing 120,000 pounds of steam per hour. The boilers are to be installed by C. C. Moore & Company, Pacific Coast construction engineers.

One of the features of new construction will be a concrete stack, 150 feet high, which will carry the gases above the height of the buildY

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# Superintendents' Program Well Under Way

for semi-annual meeting to be held December 1st and 2nd at the Hotel Portland in Portland Oregon + + + Ray Smythe appointed General Chairman by E. W. G. Cooper, Chairman of the Pacific Coast Division + + + Four superintendents to present papers.

 Plans for the December meeting of the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association are well under way according to Ray Smythe of Portland, who has been appointed general chairman of the meeting by E. W. G. Cooper, chairman of the Pacific Coast Division.

Mr. Smythe, who is in close touch with the pulp and paper industry through his representation of several manufacturers of equipment and supplies, is no novice at convention management. He went to work immediately, and on November 3rd wrote the following letter

"Some of your friends, and I thought mine, have caught me in a weak moment and wished the Chairmanship of the Superintendents Convention on me, for

Superintendents Convention on me, for December 1st and 2nd.
"I approach this assignment with somewhat mixed feelings as I thought I was getting too old to be interested in these swing parties. However, there are a few things we have to do and some things we like to do. Inasmuch as you are going to press soon I know that you will want to make up a little 'Hooey' which will be of interest to the boys in

"This meeting will be held at the Portland Hotel, which occupies the block between Yamhill and Morrison, Sixth and Broadway, in the City of Roses. This hotel is one of the finest here and under its roof has been some of the greatest celebrities of our current history. It was designed by Stanford White and looks very much like the old Ta-coma Hotel. The food is very excellent, the service perfect, and the rooms are of the large type with 20-ft. ceilings, so the high-kickers can exercise without too many limitations. It is located right in the center of the city, across the street from the theater district, and in the same building are a drug store, flower shop, tailor establishment and a beauty parlor. I believe this hotel will meet with the approval of all our members. much for the levity of the situation.

"The program will, roughly, consist

Friday, December 1st:

Registration.

Golf and Bowling for those who want

Mill visits to Camas, Vancouver, West Linn, Oregon City.

The evening will consist of the usual Costume Dance and Cabaret. There will be prizes for the best costumes,

There will be no dinner scheduled for Friday night so everyone may do pretty much as he pleases. aturday, December 2nd:

Breakfast meeting for men only at

Formal meeting and presentation of

papers, 9:30.
Stag luncheon at approximately 12:30.
Business meeting and Round Table discussion 1:30 on.
Reception 6:30.

Dinner 7:30, followed by dancing.

"An interesting program will be arranged for the ladies, including a luncheon on Saturday at some place outside the hotel.

"At the present time there are four important papers planned for the regular meeting Saturday morning, so sufficient time will be available to properly present and discuss these papers.

"I can give you the titles of two of the papers now, 'Practical Observations on Flat Screen Operation,' by Erik Ekholm, superintendent of the Puget Sound Pulp & Timber Company's unbleached sulphite pulp mill at Bellingham; and, 'The Wet Strength of Groundwood,' by Kenneth Logan, Technical Control Department, Pacific Mills, Limited, Ocean Falls, B. C.

"The round table discussion of the questions will be a most important part of the meeting and the time will be so allotted that we will not be so rushed as formerly.

The Costume Party on Friday night and the Dinner Dance on Saturday will be the main features in which the ladies will participate, and some new innova-tions will be employed in the way of pre-dinner entertainment which will add greatly to the pleasure of these two

evenings.
"The committees have not yet been set up but will be in the next few days, but the general scheme of things is to let the members have enough free time to make their own individual plans. For the ladies, facilities will be available for bridge, golf, or theater parties, as they choose. We believe that with the two choose. We believe that with the two set evenings in which the ladies will participate that there will be more op-portunity for them to enjoy the city and pursue the particular diversion which they individually desire.

"It is planned to give some door prizes at this meeting. Portland always

has a fine turn out and we hope that, due to the general business conditions, we will have a large crowd here. The advertising matter and program will be sent out within the next ten days, followed by other literature as time and expense permit.

"For those who desire reservations we will send out regular cards later on in the month, but any who wish may write my office (501 Park Building, Portland) for reservations or directly to the Port-

land Hotel. Joe Herman is the manager. land Hotel, Joe Herman is the manager.
"Since you desire or think you need a good likeness of the Honorable Chairman, I suggest that you get a picture from Miss Virna Haffer, portrait photographer, of Tacoma. She has some pictures of me which are entirely up-to-date, even some hair has been added in spots which would help prevent such a photograph from disgracing your honorable paper. able paper.

'Best regards." ls." Yours truly, Ray

We can add but a couple of points to Ray's description of plans for the meeting. Questions are wanted for the Round Table Discussion, questions which need not be signed or identified in any way. They may be sent to E. W. G. Cooper, at Camas, where Mr. Cooper is assistant paper mill superintendent for the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation; or to Anton Siebers, paper mill superintendent of the Longview Fibre Company, Longview, Washington.

One other point. Everybody is invited to attend and participate in the benefits to be derived from the discussion of common problems in the pulp and paper industry.

### Pacific Mills Installs Pulp Dryer

· Pacific Mills, Ltd., at Ocean Falls, B. C., is installing a new pulp dryer, and will put it into production this month. It is composed of equipment from the It is composed of equipment from the old No. 4 machine, including the four-drinier and drives and the dryers from No. 4 machine. It will produce from 40 to 50 tons per day of strong unbleached sulphite pulp. The pulp will be sold in the export trade.

Pacific Mills, Ltd., is running full on orders for paper from countries which previously had been depending on the Scandinavian countries as their source

Scandinavian countries as their source of supply.

### Japanese Buy Paper Pulp From Puget Sound

• The Puget Sound Pulp & Timber Company, with unbleached sulphite pulp mills at Bellingham and Anacortes, con-

tracted on November 1st to sell 3,000 tons of paper pulp to Japan, according to Ralph Roberg, sales manager.

Delivery is to be made in November and December. This is the largest order from Japan to be received by the com-

# X-Ray Examination of Equipment

by WALTER W. OFFNER\*

BRIEF outline of the industrial application of X-rays as a non-destructive testing method, before referring to specific cases in the pulp and paper industry, will demonstrate the unique position of this new inspection tool. Preceding this a few facts will be given to increase the understanding of the basic principles of the X-ray technic.

There are many materials which are more or less translucent to light such as glass, and others which are entirely opaque to it. The reason for the difference is the varying density of the material. X-rays have so much shorter wave length than light, that there is no material which cannot be penetrated by them. The range of visible light is from 8,000 to 4,000 Engstrom units while X-rays range from 500 to 0.04 Engstrom units, and probably lower. Observation reveals that the penetrating power of X-rays decrease as the density of the material examined increases or material thickness increases. It is further obvious that a large gas cavity in a steel casting is less opaque than the surrounding metal. Thus more x-rays penetrate the section containing the gas cavity than the surrounding solid material. If we can record these differences in radiation we are able to give valuable information as to the internal state of a section of material.

### Three Methods

There are three generally accepted methods of recording. One is by means of an ionization chamber employing the ability of X-rays to ionize the air. The amount of ions formed by X-rays is a function of the intensity of the X-radiation. These intensity variations are representative of the internal condition of the inspected material. This method is not widely used. Of more general application is the fluorescent screen. Here the invisible X - rays are transformed to visible light rays by the fluorescent action of cadmium tungstate. This meth-od is widely employed for the inspection of all types of food stuffs, light metal and thin steel sheets. The third method employs films as a means of recording varying densities. It is the most important method as it has few limitations. It is far superior to fluoroscopy because its definition of defects is considerably higher. It is a photographic method and essentially the same rules apply here as in ordinary photographic work. The part to be examined is placed between the source of X-rays and the photographic film.

### Industrial Uses

To give you a better understanding of the importance of X-ray examination I shall give you a brief resume of some of the more important applications of X-rays in general industry as an inspection tool.

Fluoroscopic examination is almost exclusively used in the food industry. Citrous growers apply it to prevent inferior and frozen fruit from being sold on the market. In England some sausage factories use it to find foreign bodies, bones, nails, etc. Peas have been examined to determine the degree of dehydration (Figure 1). A candy manufacturer tiring of law suits brought by persons allegdly finding stones in candies installed 100 per cent X-ray examination on every box of candy sold over its counters. Many shoe stores check the proper fit of shoes with X-rays. Various radio tube firms maintain their own X-ray plant for inspection and for improving production methods (Figure 2). It is a tremendous help for the production engineer to view the in-ternal relationship and operation of assembled machines.

One of the latest commercial applications of X-ray is the X-ray tire inspection. Here economy and safety is accomplished by rejecting bad tires and by removing nails, glass and wire before serious damage to the tire is done. X-rays have been used to show the presence of pearls in oysters, to count age rings in trees, determine the condition of tooth paste in the tube, study the ash content in coal, detect artificial gems, and to study paintings. Custom officials employ X-ray equipment for the inspection of suspicious parcels for contraband. This type of custom inspection affords not only a more thorough, almost 100 per cent inspection, but also means a considerable savings as no damage to the outer packing of the inspected goods is done. The alignment of the four color plates in color engraving can be checked before expensive engraving work is done and wasted. In the building industry walls may be examined for the detection of hidden pipe lines, or electric wiring. In reinforced concrete the grain size of the mixture can be studied as well as the placement problems of the reinforcing steel members. Wire rope and steel cables may be examined for internal discontinuities. X-ray inspection of motor bearings reveal easily any precipitation, slag inclusion or other detrimental defects.

### Iron and Steel Inspection

● The main field for X-ray examination still remains the iron and steel industry. With the recent rapid development of new alloys a more thorough inspection at a decreased cost is necessary. These new alloys may it be ferrous or non-ferrous have very improved physical properties, but have a greater tendency to internal discontinuities.

X-ray inspection in the iron and steel industry can be classified in three groups, the examination of

- (1) Castings
- (2) Forgings
- (3) Welded structures.

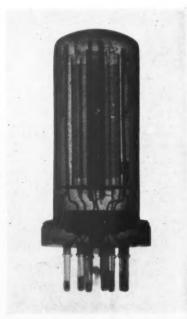


FIGURE 1—A metal radio tube is inspected by X-ray for internal alignment of parts.

<sup>\*</sup>Electrical Engineer, Industrial X-Ray Laboratories, Seattle, Washington. Presented at the Dinner Meeting sponsored by the Pacific Section of TAPPI and held at the Crown Willamette Inn, Camas, Washington, on November 7, 1939.

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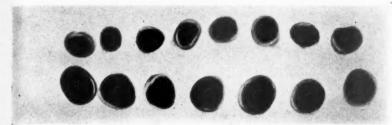


FIGURE 2-X-ograph of frozen peas to determine degree of dehydration.

There is hardly any piece of machinery used to manufacture automobiles, paper, airplanes, candies or anything else, which does not have either a casting, a forging or some welded seams. Sections up to 4 inches in thickness can be inspected readily.

The X-ray examination of castings reveals shrinkage, blowholes, pinholes, cracks, sand and slag inclusions, segregation and porosity. The older method of casting inspection was to inspect its superficial appearance, then to section it and finally to make a chemical and physical analysis of the cast metal. All this is very helpful, but can be done only on a very few samples as it takes time and is expensive. No information as to the actual internal condition of a casting can be given except by cutting it in pieces or by X-raying it.

The information obtained is a direct function of the number of units or pieces made. The result of a 100 per cent examination by means of sectioning will look something like a jig saw puzzle. An X-ray photograph will reveal the microscopic defects in one or two pictures taken and does not only save time and money but will be a permanent record for future references.

Lately in many industries castings are replaced by forgings. Here, too,

most of the internal discontinuities are discernable by X-rays. Lamination, which occurs quite frequently in forgings due to the forging operation, can be revealed easily provided the incident X-ray beam is parallel or nearly parallel to the lamination.

### Inspection of Welds

 The most popular use of X-ray examination is in the field of welded structures. The main arguments for the increasing use of X-ray in this field are various specifications, of which the A. S. M. E. boiler code is the most important. This code was first published in 1931 and applied in boiler manufacturing only. In later years it was adapted by other organizations and in several cases modified. X-ray inspection of welds not only eliminated the hazards of welded structures, but to a great extent increased confidence in the safety of welding and aid in its more economic application. As a result, not only is more welding being done in general machinery production and repair, but also several building codes are in the process of being changed to permit the replacement of riveting by welding. When, in 1931, the boiler code committee of the American Society for Mechanical Engineers revised their code, X-ray examination was specified to determine the homogeneity of the deposited weld metal. Physical and chemical tests for the determination of the quality of both the weld and the parent metal have to be done on a test coupon, which is advisable to X-ray before destructive tests are employed.

X-ray inspection furnishes a positive proof that all welded seams in the finished structure are as sound as in the test plate. Porosity, gas and air cavities, pin holes, entrapped slag, cracks and poor fusion are easily detected and repaired. Every inch of the 300,000 feet of welding on the Boulder Dam was X-rayed on location. Most of the welded seams on the Grand Coulee pipe lines are X-rayed according to A. S. M. E. specifications. The X-ray examination of welding samples made by various welders enables the shop engineer to correct faulty technique and thus assure not only an improved welding procedure but avoid accidents due to poor workmanship (Figure 3).

An X-ray examination of high pressure vessels used by a large pulp and paper company was done by the Industrial X-Ray Company of Seattle. The purpose of this examination was to determine the extent of a crack which ran circumferentially around the vessel about ½-inch from the weld. This crack was removed by grinding off and only a small amount of it remained visible. The problem was to determine whether there was any corrosion taking place at the root of the crack and whether the visible surface cracks actually were the roots of the crack without any internal exten-sion. It should be noted here that small areas of corrosion are difficult to record on an X-ray film.

Various conditions may be responsible for the origin of this

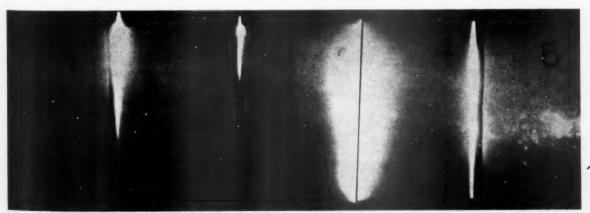


FIGURE 3—Welding samples made by five different welders to determine the best welder for a difficult welding job. Nos. 3 and 4 are good welds while the other three show porosity and poor fusion.

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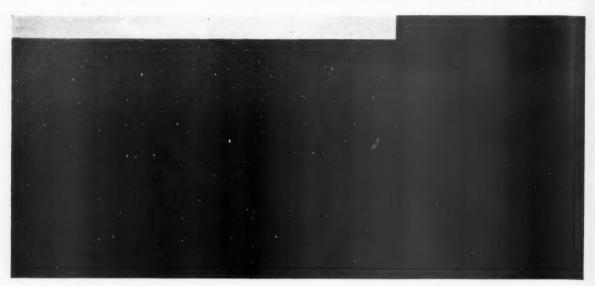


FIGURE 4—X-ograph of 1% inch weld made by a manufacturer of high pressure vessels, before vessel was put into service.

crack. A photomicrographic examination revealed a possibility of improper heat treatment. This may mean in other terms that a certain amount of stress prevailed in the areas around the weld. Various investigations published on stress corrosion cracking appear to agree that corrosion in metals under certain stress conditions is apparently accelerated. Under stress metals seem to be very susceptible to inter-granular corrosion. This possibility was underlined by certain manufacturing requirements which in this same area neessitated a change in material thickness. Thus creating a localized stress concentration. In addition to this the well known corrosive action which takes place in vessels used for pulp manufacturing completed the picture of what we may call stress corrosion cracking or what the boiler manufacturers would call caustic imbrittlement under stress.

To grind down this crack as well as to remove any abrupt changes in the cross-section seemed to solve the trouble to a certain extent. This apparently relieved internal stresses and detrimental progress in cracking was not again observed. The X-ray examination revealed no progress of crcaking not visible on the surface and no excessive corrosion could be observed. The localized nature of this circumferential crack suggests that stress was the primary reason for this failure. However, in this accelerated corrosive attack through the steel might be

stressed and subjected to suitable corrosive conditions. Some additional factors are undoubtedly involved, which needs further research to bring a simple explanation of this phenomenon. Thus the first part of the X-ray examination was satisfactory and quite encouraging.

On the same film with the cracked area we photographed the welded seam. Heavy pit marks could be observed on the surface covering almost all of the welded seam. Some pit holes were so large that it was easy to measure a depth of  $\frac{\pi}{10}$ -inch. Here again the question arose, did corrosion stop at the surface of it or did it continue inside

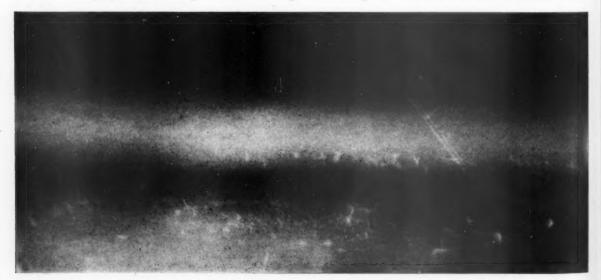


FIGURE 5—Same section of 1% inch weld after it was in service for about three years. Vessel contained a corrosive agent.

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the weld. The X-ray pictures shows the pitting in addition to areas with small short crack lines in random directions. The absence of a certain direction of the cracking like in the above mentioned case, obviously is an indication that here internal stresses are not influencing factors. In the first case we have an example that the corrosion rate decreases to practically nil after detrimental stresses were to a more or less degree released. In the second case corrosion appears in areas which don't indicate any pronounced stresses. A photomicrographic study of the section in question was made. As this investigation has not been completed we cannot give you any definite statements on the final results. It might be corrosion, along grain boundaries or it might be transcrystalline cracking or some other kind of detrimental decomposition of metal (Figures 4 and 5).

Many of you are familiar with the new fuel hog cutter manufactured by Stetson-Ross, Seattle. The part under greatest working stress is the high speed mandrel. A failure of this mandrel would not only mean expensive damage to the whole machine but might cause a serious accident. This mandrel is forged and the sections highly stressed were X-ray examined.

Only a few of the many applications of X-rays in industry have been described, but enough to show clearly their effectiveness in decreasing costs, improving quality and in providing greater safety.

We are living in a machine age and its rapid progress makes it necessary for the engineering profession to employ the most modern scientific methods in order to control and use these machines to the best advantage.

### Sodium Sulphite Pulping **Experiments Completed**

The experiments on the sodium sulphite pulping of Douglas fir carried on in the semi-plant pulp laboratory at the University of Washington by Dr. Kenneth A. Kobe, associate professor of the Department of Chemical Engineering and Dr. L. C. Haffner, chemical engineer of Portland, were completed during the summer and the reports are now in course of preparation.

A modified sodium sulphite process for pulping Douglas fir was developed, according to Dr. Kobe, which produced a superior pulp with good yield. The pulp is characterized by a very high tear test and a bursting strength but slightly below that of Western hemlock pulp. The fir pulp possesses good bleach-ability and loses but little strength in bleaching. The cooking time required for Douglas fir was about eight hours. In addition to Douglas fir, hemlock, Southern pine, aspen and cottonwood were pulped by the new sodium sulphite

The modification of the process en-abled the experimenters to develop what they consider a fully satisfactory waste liquor recovery process. They report liquor recovery process. They report that it operates similarly to the sulphate recovery system. The waste liquor is evaporated, burned and treated to regenerate sodium sulphite cooking liquor and to recover the sulphur for reuse. The equipment employed is of the standard sulphate recovery type except that the lime kiln and causticization equipment is eliminated.

ment is eliminated.

After the process was considered to have been fully developed about a half a ton was produced for testing by several paper mills. It is expected that additional paper making tests will require the production of more of the fir pulp in the University laboratory at an early date. No plans have been made as yet for full commercial production or recovery of the waste liquor.

It is pointed out by Drs. Kobe and Haffner that a satisfactory pulping proc-

Haffner that a satisfactory pulping proc-

ess for using Douglas fir would be of great benefit to timber owners, loggers and sawmill operators in the Pacific Northwest through the utilization of low grade logs. These are now a burden to the industry. It was to give economic value to the low grade fir timber that the two men collaborated in the development of their modified sodium sulphite process.

### St. Helens Running On Full Schedule

• The St. Helens Pulp & Paper Co. is running on full schedule, with produc-tion at capacity, according to President Max Oberdorfer.

The company has completed their improvement program for the present, fol-lowing completeion of raising the di-gester house and the installation of larger chip bins.

Other improvements in the past few months include a new chlorinating sys tem and additional bleach tanks, remodeling of the wood room, and the installation of a Tomlinson furnace.



FIGURE 6-AVIOGRAPH, a new field X-ray unit for the inspection of airplane parts. Manufactured by the Industrial X-ray Laboratories of Seattle.



### **Rayon Continues Its Expansion in United States**

It is estimated by the Rayon & Textile Monthly that during the Raylon & Textile Monthly that during the Fall and Winter months new rayon and staple fiber plants are coming into production which will add approximately 50,000,000 pounds annually to the productive capacity of the industry in this country.

This estimate includes the expansion of the American Viscose Corporation's of the American Viscose Corporation's plant and the starting of production at its Front Royal, Virginia, plant; the expansion of the Celanese Corporation's Pearisburg, Virginia, plant; the expansion and full production quota from the Painesville, Ohio, plant of the Industrial Rayon Corporation; the expansion in production of other units of DuPont, North American, Tennessee Eastman, Tubize Chatillon, American Enka as well as increases in the output of eight other rayon yarn producers operating single units of less than 10,000,000 pounds pro-

duction yearly.

The Rayon & Textile Monthly points out that this expansion is all the more consumpout that this expansion is all the more surprising as it represents the consump-tive capacity of the United States alone, there being but a very small quantity of American made rayon yarn or staple fiber finding an export outlet.

Cellulose Plastics Industry Experiencing Recovery

Production figures released by the U. S. Bureau of the Census on cellulose plastics production for the first nine months of 1939 show a gain of 45 per cent in the nitrocellulose plastics industry over the same period in 1938. Production of sheets, rods and tubes of nitrocellulose amounted to 9,608,741 pounds in the first three quarters of this year as compared with 6,629,696 pounds in the same 1938 period. The total 1938 production was but 9,487,926 pounds. However, production is still far below that of 1937 when 14,769,344 pounds

However, production is still far below that of 1937 when 14,769,344 pounds were produced in the first nine months.

The production of cellulose acetate sheets, rods, tubes and molding composition in the first nine months of 1939 totaled 14,578,529 pounds as against 8,004,222 pounds in the comparative 1938 period. This increase amounts to 82 per cent. In the first nine months of 1937 production of cellulose acetate sheets, rods and tubes amounted to 10,908,623 pounds. Molding composition 908,623 pounds. Mo was not listed in 1937. Molding composition

A considerable amount of wood pulp is used in the manufacture of nitrocellu-lose plastics in mixture with cellulose de-rived from cotton linters. The propor-

tions are not publicly known but vary with the type of product produced. As yet wood pulp is not employed commercially in the production of cellulose acetate, cotton linters retaining their dominance in this product. It is expect-ed, however, that wood pulp will enter this field in 1940 by reason of new and more highly refined grades and because of the anticipated rise in the cost of cotton linters. Technical problems involved in using wood pulp in the production of cellulose acetate are said to have been solved some time ago, but the decline in cotton linter prices in early 1938 made the use of linters more economical at least temporarily.

### Viscose Corporation Further **Expands Staple Fiber** Production

 Early in October the Viscose Cor-poration announced that a new unit to be built at the company's Front Royal, Virginia plant will add 25,000,000 pounds annually to the staple fiber production, bringing the annual total up to 90,000,000 pounds.

At the present time the Viscose Corporation's staple fiber capacity is a little poration's staple fiber capacity is a little under 30,000,000 pounds annually. This includes the Parkersburg, West Virginia, unit and the first unit at Nitro, West Virginia. The second Nitro unit starts operations this month (November) and will be in full production by early spring, bringing the company's total to 65,000,-000 pounds annually.

The new Front Royal unit will be ready for operations early in the summer of 1940 as the viscose producing end is completed now and the installation of the staple fiber spinning and finishing

equipment is the work remaining.

The raising of the Viscose Corpora-

tion's annual production of staple fiber from 30,000,000 pounds to 90,000,000 pounds will increase the concern's con-sumption of wood pulp by approximately 35,000 short tons annually

### Reports Japan Buying 50,000 Tons Rayon Pulp

• The Bureau of Foreign & Domestic Commerce, U. S. Department of Com-Commerce, U. S. Department of Commerce received a report early in October from the United States Trade Commissioner in Tokyo to the effect that Japan was expected to place orders for 50,000 short tons of rayon grade wood pulp by November 1st for delivery before the end of February, 1940.

Of this total, the report said, United States mills would receive approximately

States mills would receive approximately 20,000 short tons and Canadian mills 5,000 short tons, the remaining 25,000 short tons going to Scandinavian pulp

The portion to be received by mills in this country thus will remain at 40 per cent of the total rayon pulp imported by Japan, the precentage in effect for sev-

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eral years.

Of the business placed by Japan in June the Canadian mills (The British Columbia Pulp & Paper Company) received 14,560 short tons.

Japan's imports of rayon pulp de-pends upon available foreign exchange and upon the volume of exports of rayon yarn and piece goods and staple fiber and cloth made from it.

## Vancouver Rayon Plant May Be Completed Soon

• Directors of Vancouver Rayon Silk, Ltd., \$2,500,000 British Columbia rayon project, are being asked by Paul Zuest, managing director, to go ahead with immediate construction of factory buildings and installation of machinery and equipment necessary for the weaving, dyeing and printing processes.

Later, the company expects to launch construction of the larger plant for yarn, knitting, staple fiber spinning and viscose processes. By getting the smaller unit under production Mr. Zuest believes that the company will be able to

expedite marketing.
Mr. Zuest, who for years was active in rayon plants in Switzerland, Czecho-Slovakia and Germany, has returned from a four months' trip to Europe and announces that, in spite of war condi-tions, he was able to make considerable headway. He reached London two months before war broke out, and he continued his survey of European rayon conditions for two months after the out-break. Many of the arrangements that he had made in July and August required sweeping revision after Britain, France and Germany went to war. One

complication was the inability of obtaining immediate assistance from the Moritz & Pincof organization in Hamburg, which controls some of the processes to be operated in Vancouver. Howesses to be operated in Vancouver. Flow-ever, this firm has its chief marketing headquarters in London and, with the exception of difficulty over export of capital, it is expected that no serious obstacles will be encountered in the near

While in Europe, Mr. Zuest visited not only the United Kingdom, but France, Switzerland and Germany. He reports that his plans for the Vancouver enterprise were approved by ryaon experts in all the countries visited. He has en-gaged Dr. Leo Beryl, Czech rayon chemical engineer, to act in an advisory capacity when the plant is under construction in Vancouver, and Dr. Beryl is likely to hold a permanent position with the com-

pany as supervising engineer.

Vancouver financial participation may be increased to include finishing of the factory buildings on the North Van-couver site. Construction is reported to be already well advanced, and few changes apart from the installation of machinery will be necessary before the plant goes into production.

The new financial arrangements for all factory equipment have been under discussion and have advanced to the stage where only the final approval of both the contracting parties and con-sent of the B. C. Security Commission is

Arrangements made by Mr. Zuest for the sale of the company's production have reached the conclusive stage, he states, and reciprocal agreements are being made with an eastern Canadian being made with an eastern Canadian rayon manufacturing company understood to be Courtaulds, Ltd., which will make it possible for the two organizations to work in harmony in both the domestic and export fields.

Mr. Zuest says that he established business contracts while overseas with rayon interests in Britain, Switzerland, Latvia, India, Irak, South America, Australia and New Zealand.

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flow of investment capital and the sup-ply of machinery and equipment because of the concentration of some factories on war orders, there has been an off-setting advantage in the tremendous stimulus given to the rayon market," Mr.

Zuest declared.
"Some of the big producing countries have been frozen out of the world mar-ket as a result of war conditions. The rayon plants of Central Europe, for inrayon plants of Central Europe, for instance, are unable to ship their product. There is a bigger on ortunity than ever for the distribution of rayon products from the Pacific Northwest, and Vancouver should be able to win a big place "Another result of the war should be an increased use of Pacific Northwest pulp in rayon plants that were previously dependent on Sweden and Russia for their raw material."

### **Rayonier Reports Prospects Brighter**

 The middle of October Rayonier Incorporated issued a statement to the press stating that the company had received orders from domestic dissolving pulp customers covering their requirements for the entire year of 1940. These orders were said to represent substantial increases over the tonnages bought during the current year .

### Terens Announce Arrival of Son

• Nils G. Teren, vice-president and general manager of the Columbia River Paper Mills, and related interests, is receiving congratulations on the birth of a son at Emmanuel Hospital, Portland, Oregon, on Nov. 2. Mr. and Mrs. Teren already have two girls, this being the first boy of the family.

The new arrival has been named Nelson Frederick Teren.

### Bates Valve Bag Incorporates in B. C.

• Bates Valve Bag Company has been incorporated in British Columbia as an extra-provincial company with a paid-up rapitalization of \$250,000. Head office will be at the plant established in Vancouver, B. C., two years ago at 146 West Second Avenue. The company is engaged in manufacture of patented paper bags.

### Mortgage on Tumwater Foreclosed by Court

On October 31 the Thurston County Superior Court at Olympia, Wn., entered a decree foreclosing the mortgage on the Tumwater Paper Mills Co., held by two banking firms as security for a \$400,000 bond issue.

The bonds were issued May 1, 1929, and matured May 1, 1939. Only one bond, in the denomination of \$1,000, was paid, leaving the balance of \$399.

Part of the equipment of the mill, which has been inactive for several years, had been leased to the Columbia River Paper mills of Vancouver, Wn., which company was named as co-defendant.

In the complaint the plaintiff admitted priority of a lien of \$40,000 held by the Columbia River Paper Mills for advances Columbia River Paper Mills for advances made in maintaining the plant and equipment, and a lien of approximately \$26,000 held by the Columbia River Paper Co. The foreclosure was, of course, subject to these prior claims.

The plaintiffs asked foreclosure, with proceeds, after payment of priority claims, to be used to pay \$5,000 in trust fees, \$5,000 in attorneys fees, and more than \$10,000 for advances made by the

than \$10,000 for advances made by the trust in maintaining the property, and bayment of taxes and insurance. Pay-ment also was asked of the \$399,000 in outstanding bonds and interest coupons, on a pro-rata basis.

### Paper Production Near Limit of Capacity

The production ratio report issued weekly by the American Paper & Pulp Association showed a ratio of paper production to capacity of 97.1 per cent for the week ending October 28th as compared with 81.8 per cent for the same week a year ago.

For the four weeks of October the unadjusted average was 96.4 per cent as against 82.5 per cent in October, 1938 (adjusted average). September, 1938, production was 76.3 per cent.

Paperboard production as reported by the National Paperboard Association was 85 per cent of capacity for the week ending October 28th. The unadjusted average for October was 84 per cent and for October, 1938, the percentage was

The paper production ratio for the first 43 weeks of 1939 is 82.8 per cent as compared with 71.3 per cent for the same period in 1938.

### **Buff Natwick Fully** Recovered from Illness

• A. G. "Buff" Natwick, assistant manager of the Crown Willamette mill at Camas, Wash., is back on the job, fit as a fiddle and ready to do battle, after an illness of several weeks.

### The Cover Photograph,

a night picture of the Puget Sound Pulp & Timber Company's unbleached sulphite pulp mill at Bellingham, Washington, was taken by Lee Isaacson of that

### **Dick Buckley Named Chief** Chemist at Pomona

 Richard Buckley has been appointed chief chemist at the California Fruit Wrapping Mills in Pomona, California, manufacturers of tissues. He succeeds A. V. Alm, who resigned several months ago and went East.

Mr. Buckley has had considerable experience in the manufacture of both pulp and paper. He was chemist at the Ev-erett unbleached sulphite pulp mill of the Pulp Division Weyerhaeuser Timber Company from the time the mill started in 1936 until October of this year when he left for Pompon. he left for Pomona.

Prior to his connection with Weyer-haeuser, Mr. Buckley served several years as a chemist with the Everett Pulp & Paper Company, manufacturers of book and specialty papers at Everett, Washington. There he gained actual mill experience in the production of soda pulp and papers.

### B. C. Pulp and Paper Running Full

 British Columbia Pulp & Paper Comwhich is now operating its two mills at capacity, does not expect to share in increasing pulp prices until the beginning of 1940 as all orders now being handled are on a contract basis with prices revised every six months.

Owing to war conditions and the resultant uncertainty in markets everywhere it is possible that the price will be fixed for the first quarter of 1940 rather than for the half year, making a further upward revision possible at the end of March.

President Lawrence Killam says that B. C. Pulp & Paper Company has received orders from Japan sufficient, with additional smaller business, to keep the Port Alice and Woodfibre mills running full time until January. It is expected that new business will be closed at the higher figure to insure continued operation.

One advantage of doing business with Japan at present is the fact that it is able to supply ample tonnage. Under war conditions all British merchant shipping has been commandeered and very little of it is available for transpacific business. In fact, B. C. lumbermen are having a hard time getting ships for lumber that is vitally needed in the United Kingdom and already ordered. United Kingdom and already ordered.

Japanese shipping lines, however, are under no such restrictions, with the result that they are now reported to be operating about 70 per cent of the cargo business on this ocean foremrly carried on by British ships.

### Carl Oberdorfer Working in Lab.

● Carl Oberdorfer, second son of Max Oberdorfer, president of the St. Helens Pulp & Paper Co., and who recently graduated from high school, is now working in the laboratory at the St. Hel-ens, Ore., plant, spending a year gaining experience in the business before going to college. to college.

Max Oberdorfer, Jr., is now attending the University of Washington, following considerable experience in the industry in the south and at St. Helens.

# TAPPI Discusses Machine Wires And X-Rays at Camas Meeting

EARLY 100 members and guests of TAPPI gathered at the Crown Willamette Inn at Camas, Washington, home of the big specialty paper mill of the Crown Zellerbach Corporation, the evening of November 7, for the second meeting of the Pacific Coast Section for the current year.

The group held a dinner in the main dining room of the inn, and at its conclusion convened to the meeting room, where the speakers were presented and the lantern slides and movies shown.

Chairman N. W. Coster of the Pacific Coast Section presided and introduced the speakers and their topics.

Harry G. Specht, vice-president and general manager of the Eastwood-Nealley Corporation of Belleville, N. J., presented a paper on "Paper Machine Wires," accompanied by lantern slide illustrations. His remarks will be reported and illustrated in a subsequent issue of Pacific Pulp and Paper Industry.

The "X-Ray Examination of Industrial Equipment" was the subject of W. W. Offner of Seattle, his talk being illustrated both by slides and by a portable X-ray machine which attracted much attention after the meeting. Mr. Offner's paper appears in this issue.

The final feature was a sound film, "Packaging, a Public Service," showing how packaging of familiar products in cartons, etc., contribute to modern progress. It was shown through the courtesy of Modern Packaging on a machine furnished by the Pacific Coast Supply Company and operated by Ed Tidland of that company.

The next TAPPI dinner meeting on the schedule will be held in Tacoma, Washington, on Tuesday evening, January 9th, 1940. The program and the place will be published in the December number. No dinner meeting will be held in December as the Pacific Coast Division of the American Pulp & Paper Mill Superintendents Association will be meeting December 1st and 2nd at the Hotel Portland in Portland,

The following men attended the dinner meeting sponsored by the Pacific Section at Camas on November 7th:

C. E. Ackley, Hawley Pulp & Paper Co., Oregon City; C. A. Anderson, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; G. A. Atkins, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Lee C. Baltzelle, Pacific Indemnity Co., Seattle; C. T. Beals, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; C. H. Relyin, Corp. Zellerbach Corp., Camas; C. H. Belvin, Chromium Corp. of America, Portland; John E. Brown, Pacific Pulp & Paper Industry, Portland; Thomas F. Buford, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; John M. Carlson, Soundview Pulp Co., Ev-erett; J. E. Cater, Hawley Pulp & Paper Co., Oregon City.

Co., Oregon City.

G. W. Charters, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; R. E. Chase, R. E. Chase & Co., Tacoma; Claud Christiansen, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; William W. Clarke, Longview Fibre Co., Longview; N. W. Coster, Soundview Pulp Co., Everett; H. W. Dassel, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Howard J. Ells, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Clarence Enghouse, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., West Linn; A. E. Erickson, Pulp Corp., West Linn; A. E. Erickson, Pulp Division, Weyerhaeuser Timber Co., Longview.

Carl Fahlstrom, Longview Fibre Co., Longview; M. J. Franklin, Crown Wil-lamette Paper Co., Division of Crown Zellerbach Corp., Camas; J. D. Fraser, Pulp Division, Weyerhaeuser Timber

Co., Everett; J. P. Foley, Hawley Pulp & Paper Co., Oregon City; C. F. Gaiser, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Portland; Howard Graham, Crown Zellerbach

Corp., Port Angeles.

T. H. Grant, Columbia River Paper
Mills, Vancouver, Wash.; R. B. Haight,
Crown Willamette Paper Co., Division of Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; H. R. Heuer, Pulp Division, Weyerhaeuser Timber Co., Longview; W. S. Hodges, Asten-Hill Mfg. Co., Portland; C. F. Holcomb, Edison Storage Battery Supply Co., Seattle; George Horton, Longview Fibre Co., Longview; J. H. Hull, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; W. C. Lacoby, Crown Willamette Paper Co.

of Crown Zellerbach Corp., Camas; W. C. Jacoby, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Jack E. Johnson, Philadelphia Felt Co., Portland.

L. T. Johnson, Hawley Pulp & Paper Co., Oregon City; W. A. Kelly, The Waterbury Felt Co., Portland; J. B. Knight, Jr., Crown Willamette Paper Co., Division of Crown Zellerbach Corp., John A. Liedtke. Crown Willamette Paper Co., Division of Crown Crown Willamette Paper Co., Division of Crown Willameter Paper Co., Di Co., Division of Crown Zellerbach Corp., John A. Liedtke, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Gustaf A. Lorenz, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Dorsey E. Lowther, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; A. H. Lundberg, Seattle; William P. Luthy, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Robert W. Martig, Brown Instrument Co., Portland: Leland F. Maybach. ment Co., Portland; Leland F. Maybach, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; B. T. McBain, Portland.



At the TAPPI Dinner Meeting in Camas, Washington, November 7th, left to right, HARRY G. SPECHT, Vice-President and General Manager of the Eastwood-Nealley Corporation of Belleville, N. J., who gave a talk on "Paper Machine Wires"; FRED A. OLMSTED, Technical Supervisor of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, and Vice-Chairman of the Pacific Section of TAPPI; and, WALTER W. OFFNER of the Industrial X-Ray Company, Seattle, who spoke on "X-Ray Examination of Engineers". Equipment.

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J. H. McCarthy, Soundview Pulp Co., Everett; C. R. McCully, Research Dept., Weyerhaeuser Timber Co., Longview; L. D. McGlothlin, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; George H. McGregor, Pulp Division, Weyerhaeuser Timber Co., Longview; A. M. Mears, Pacific Coast Supply Co., Portland; O. Michaelis, Crown Willamette Paper Co. Division of Crown Zellerbach Corp., Camas; G. F. Mitchill, Hesse-Ersted Iron Works, Portland; P. Millard, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; George Nelson, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; George Nelson, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; George Nelson, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; George Nelson, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Frederic M. Pape, Wilson & Geo. Meyer & Co., Seattle; F. A. Olmsted, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Frederic M. Pape, Wilson & Geo. Meyer & Co., Seattle; H. Prelinger, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Frederic M. Pape, Wilson & Geo. Meyer & Co., Seattle; H. Prelinger, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; E. D. Rich, Oregon Pulp & Paper Co., Salem; H. L. Rudow, Scientific Supplies Co., Seattle.

S. A. Salmonson, Soundview Pulp Co., Everett; W. A. Salmonson, Simonds Worden White Co., Seattle; F. V. Sams, Allis Chalmers Mfg. Co., Portland; Brian Shera, Pennsylvania Salt Mfg. Co. of Washington, Tacoma; C. Sholderbrand, Hawley Pulp & Paper Co., Oregon City; A. P. Siebers, Longview Fibre Co., Longview; Fred R. Sievers, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Portson, Cellerbach Corp., Camas; Herman N. Simpson, Crown Zellerbach Corp., Portson, Zellerbach Corp.,

Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Herman N. Simpson, Crown Zellerbach Corp., Port

Simpson, Crown Zellerbach Corp., Port Townsend; Harry G. Specht, Eastwood-Nealley Corp., Belleville, N. J.; L. E. Stevenson, Pulp Division, Weyerhaeuser Timber Co., Longview.

Franz Sturm, Oregon Pulp & Paper Co., Salem; F. F. Sullivan, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; A. Ward Tedrow, Hawley Pulp & Paper Co., Oregon City; J. M. Tedford, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; E. H. Tidland, Pacific Coast Supply Co., Portland; V. L. Tipka, Hawley Pulp & Paper Co., Oregon City; Cecil L. Triplett, Hawley Pulp & Paper Co., Oregon City; Bernhardt Weidenbaum, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas.

Paper Co., Division of Crown Zellerbach Corp., Camas.

Fred Weleber, Hawley Pulp & Paper Co., Oregon City; Rex West, Longview Fibre Co., Longview; S. E. Wightman, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; A. D. Wood, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas; Edward P. Wood, Pulp Division, Weyerhaeuser Timber Co., Longview; Herbert H. Wymore, Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas.

Ronald Benson Joins TAPPI

W. Ronald Benson, technical super-visor of the National Paper Products Company, Division of Crown Zellerbach Corporation, at Carthage, New Yorecently became a member of TAPPI.

Mr. Benson, who graduated from the Department of Chemistry and Chemical Engineering at the University of Washington, is the son of Dr. H. K. Benson, executive officer of the department.

### Paperboard Production Sets New Record

Turning out more paperboard in September than in any previous month in history, the industry was unable to keep pace with incoming orders and unfilled orders on September 30 stood at a higher level than at the end of any month in the past six years. From 119,502 tons level than at the end or any mount in the past six years. From 119,502 tons on August 31, unfilled orders for the paperboard industry jumped to 290,467 tons on September 30, 1939. On Sep-tember 30, 1938, unfilled orders were only 109,288 tons, but that was the high point for that year.

In September, 445,387 tons of paper-board were produced, according to the Department of Commerce, which com-pared with 443,226 tons in August and 351,051 tons in September, 1938. Every month this year to date had production greater than in the corresponding months of 1938, but September was the third successive month to show greater production than the corresponding month of 1937. As a result, total production quetion than the corresponding month of 1937. As a result, total production for the first nine months of 1939 passed the output in the like period of 1937, which was the previous high point for the industry. In the period this year a total of 3,464,256 tons of paperboard was produced against 2,771,899 tons a year ago and 3,442,266 tons in the first nine months of 1937.

In the first nine months of 1937, page 1937,

In the first nine months of 1937, production was at the rate of 82.6% of capacity. This year, although production is greater, it was only 68.3% of capacity because estimated capacity for the nine months is nearly 25% greater than it was two years ago. than it was two years ago.

Camas Paper School In New Quarters

 The remodeling of the second floor of the McMaster Building, across the street from the offices of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, Washington, was completed the second week in November and the Camas Paper School transferred its classes to the new quarters.

By removing partitions, an auditorium of sufficient size was provided to accom-modate the growing school classes.

Chemipulp Publishes **Practical Sulphite** 

Operating Handbook

Chemipulp Process, Inc., Watertown,
N. Y., announces the publication of a
hand book of nearly 200 pages prepared
expressly for the sulphite operator that
it might be of everyday use to him in dealing with practical operating prob-

The book contains an historical summary of the discovery and development of the sulphite pulping process, as well as interesting discussions and practical as interesting discussions and practical suggestions on wood preparation, acid making and cooking; also, a treatise on the Chemipulp Hot Acid Cooking and Recovery System. More features are included in the last half of the book which is given to tables, charts, and graphs. This part of the book should be of particular interest to the sulphite pulp mill ticular interest to the sulphite pulp mill manager and operator.

Copies are being sent at no cost to all users of the Chemipulp System; also, to those who requested books before publication. After this demand is met, copies can be purchased at cost from the publisher, A. M. Phillips, Buck Terminal Building, Watertown, N. Y.

### Chemurgic Conference Meets in Seattle

• The Washington State Chemurgic Conference was held on November 4th in the Chamber of Commerce building in in the Chamber of Commerce building in Seattle. Sponsored by the Washington State Planning Council, the Washington State Grange and the Seattle Chamber of Commerce, the meeting included papers on a number of subjects dealing with the more profitable usage of products of the soil.

Starting with a breakfast at 8 o'clock, which was attended by more than two hundred and fifty men and women, the well filled program lasted until 5 p.m.

At the breakfast meeting two papers

At the breakfast meeting two papers of interest to the sulphite pulp industry were presented. Bernhard T. Winiecki of Rayonier Incorporated at Shelton, Washington, spoke on "Agricultural Uses of Waste Liquor from Sulphite Pulp Mills." Dr. Alan J. Bailey, assistant professor of chemistry and acting director of cellulose and lignin research at the University of Washington, spoke on "Industrial Uses of Waste Liquor from Sulphite Pulp Mills."

Both of these papers are printed else-

Both of these papers are printed else-

Both of these papers are printed elsewhere in this issue.

At the luncheon Dr. H. K. Benson, executive officer of the Department of Chemistry and Chemical Engineering of the University of Washington, talked on "New Weapons of Attack in Agriculture and Industry." In the afternoon session Ralph W. Frey, senior chemist, Industrial Farm Products Division, U. S. Department of Agriculture, Washington, D. C., spoke on "Western Hemlock Bark, an Untapped Reservoir of Tannin."

### That Book Paper Investigation

The Federal Trade Commission's investigation of the book paper manufacturers about which we heard so much

last summer, was suspended until further notice early in August.

A number of people in the industry have asked why nothing more has appeared in print. No one seems to know the status of the investigation. After the hearing in St. Louis, Missouri, which followed the San Francisco hearing at the ord of Luly, the Commission's extrapers end of July, the Commission's attorneys announced that they had no further hearings scheduled at that time, but would reserve the right to call the next hearing upon 5 days notice. As far as can be determined that is the way the matter stands at present.

### Collins Visits St. Helens

Martin Collins, president of the Gra-ham Paper Co., St. Louis, sales agents for the St. Helens Pulp & Paper Co., visited St. Helens late in October while on his annual trip covering the entire

### Jacoby of Riegel Visits Coast

• F. I. Jacoby, superintendent of the Riegel Paper Co. at Milford, N. J., recently visited the Coast. He was at Camas early in November, then went on to Longview, from where he went into the woods with R. B. Wolf and W. Norman Kelly of the Weyerhaeuser Timber Co. pulp division to view the logging operations.

### Weyerhaeuser Circulating Systems Have Unique Features

by GERALD F. ALCORN

Installation of forced circulation in the EVERETT MILL, PULP DIVISION WEYERHAEUSER TIMBER COMPANY, has improved the quality and the uniformity of the unbleached sulphite production.

HE system of forced circulation which has been in full operation at the Everett Mill, Pulp Division, Weyehaeuser Timber Company, for a number of months, possesses several unique and interesting features.

When the Everett unbleached sulphite mill was built in 1936 the possibility of later installation of circulating systems on the six 52x171/2 foot digesters was kept in mind, and space was left to permit almost straight line piping of the circulating systems. The suction lines from the strainers to the pumps are practically straight drops from the strainer fittings to the pumps.

On the discharge side straight runs of piping containing venturi throats for metering, connect the pumps with the bottom fittings of the digesters. As a result of this simple piping arrangement friction has been kept at a minimum and power has been saved.

It was desired to keep the power requirements of the circulating systems as low as possible to avoid the

purchase of additional outside power. With this thought in mind, 75 horsepower, 80 per cent leading power factor synchronous motors were installed for operating the six pumps. The combination of straight piping, with almost a total absence of right angle bends, and the above mentioned synchronous motors has resulted in a much improved power factor and the mill is able to carry a greater load on its own generating system.

 Some indication of the acid circulation rate through each digester was considered necessary. It was believed that ammeters on the synchronous motors would not give a satisfactory indication of the power consumption of the pumps. To provide a more accurate method of determining the rate of acid flow, venturi throats were fabricated of stainless plate in the section of pipe between the pump discharge and the digester bottom fitting. The actual throat section is a casting, machined to an accurate diameter and welded in the pipe section on the downstream side of the pump. Mechanical flow meters are employed to indicate and record the rate of acid flow.

A saving of approximately seven horsepower has been effected by using the venturi throats instead of orifices. As no flanges are used for the throat installation the cost of the venturi throats were less than the cost of orifices.

The six stainless steel pumps are rated at 3,800 gallons per minute and were manufactured by the Bingham Pump Company of Portland, Oregon. The pumps give a complete acid turnover every ten minutes at an actual power consumption of 68 horsepower.

The entire system is of chromenickel- molybdenum stainless steel. The piping was fabricated from stainless steel plate and has welded seams. The Electric Steel Foundry Company of Portland, Oregon, suplied all of the piping, valves and fittings for the Everett circulating system.

It is felt by the management that the expenditure for the circulating systems has been justified by improved operating conditions, by improvement in quality and in the uniformity of the unbleached sulphite pulp produced by the Everett

### Inland Empire Adds To Employees

The Inland Empire Paper Company of Millwood (Spokane), Washington, producer of newsprint and specialty papers, is running on a six-day schedule and has recently added fifteen men to the permanent payroll, according to a dispatch in the Spokesman-Review.

The company's payroll is now around \$40,000. "Cutting off of imports from the Scandinavian countries, leaving the American mills to handle the domestic market and increased foreign trade." American mills to handle the domestic market and increased foreign trade," General Manager C. A. Buckland was quoted as saying. "We are now producing 660 tons a week and employing more than 300 men. Crews are working six days a week instead of five.

"Although the war is largely responsible for the increase, the boom began early in August," he added.
"September was our best month in

early in August," he added.
"September was our best month in
two years. We are receiving our heaviest orders from Spokane, throughout
Washington, Montana, Colorado, Texas,
California and the Philippines. Inquiries for orders have been received from South America, Mexico and China," said Mr. Buckland.

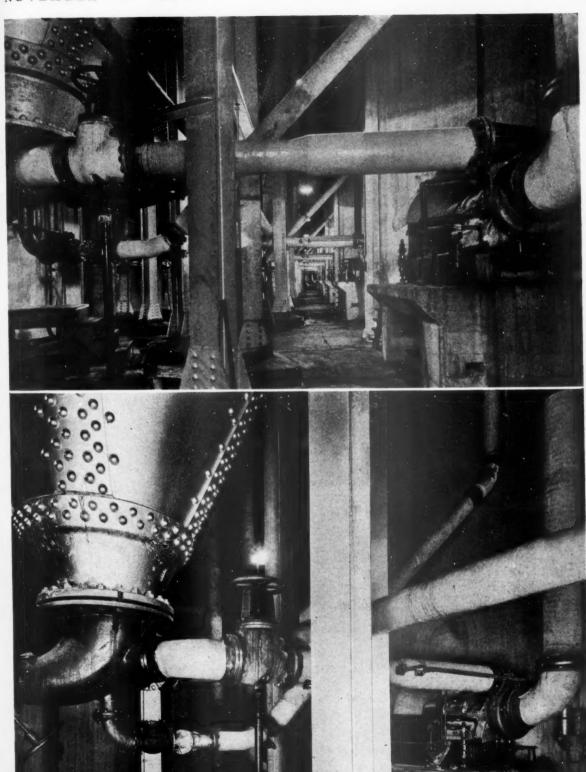
Orders on hand call for capacity op-erations at Millwood well into next year. In addition to General Manager Buckland, the officers and operating executives are: A. W. Witherspoon, president; W. Stilson, vice-president; George Witham, Jr., assistant manager; Myron W. Balck, technical director; and J. L. Janecek, paper mill superintendent.



GERALD F. ALCORN, Technical Director, Everett Mill, Pulp Division Weyerhaeuser **Timber Company** 

The six circulating systems in the unbleached sulphite pulp mill of the Pulp Division Weyerhaeuser Timber Company at Everett, Washington, are shown in the two photographs on the opposite page.

The stainless steel piping, valves and fittings were manufactured by the Electric Steel Foundry Company of Portland and the stainless steel circulating pumps were furnished by the Bingham Pump Company of Portland,



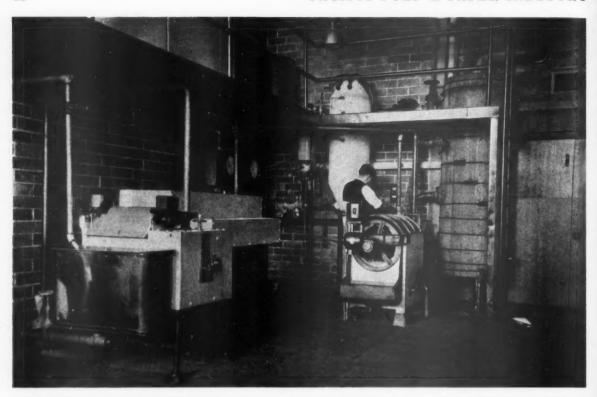
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A general view of the well equipped semi-plant pulp laboratory completed this past summer in the Department of Chemical Engineering at the University of Washington / / The rotary digesters and test bench are along the right wall just outside this picture but shown in another photograph / / The bleaching system, also shown in another picture, is behind the camera in this view.

# Semi-Plant Pulp Laboratory Completed at University of Washington

by KENNETH A. KOBE\*

DURING the past summer the semi-plant pulp laboratory in the Department of Chemical Engineering at the University of Washington in Seattle has been completed in its initial layout. The equipment already has proved its worth in the research and development of a new sodium sulfite process for the pulping of Douglas fir.

An earlier article (Pacific Pulp and Paper Industry, December, 1935) described the contemplated design of the various laboratories in Chemical Engineering. These designs were followed with but slight changes, except for the Pulp Laboratory. It was found that the room designated for this work would not adequately house all the equipment constructed for the semi-plant operations, so the room was increased in

size. Adjacent to the pulp laboratory is the control laboratory equipped with laboratory facilities so that all chemical work may be carried out here. Adjacent to the control laboratory is the process laboratory in which can be carried out semi-plant scale work on the various steps in processing pulp for chemical utilization.

### The Pulp Laboratory

• The pulp laboratory occupies a room 19x33 feet in size. Special utility lines are brought into this room to supply high pressure steam, hot and cold water, gas, compressed air, direct and alternating current. A large gutter runs the length of the room so that waste can be washed into it to be emptied into a sump which retains the larger material. Along the wall adjacent to the control laboratory are the rotary

digesters and test bench. Four rotary digesters are available in two sizes, 25 and 50 liters, and in steel and stainless steel suitable for both alkaline and acid pulping. The steel bodies are wound with resistance elements so that varied heating rates can be secured. The tumbling action as the digester rotates gives excellent circulation in these small digesters. Charges of 2000 grams or 5000 grams of chips are used in the 25 or 50 liter digesters. Working on this small scale requires no great expenditure of material and gives sufficient pulp for test purposes. The data obtained here may be translated to the semi-plant digester for verification on a larger scale. The test bench adjacent to the rotary digesters has the usual mill equipment of sheet moulds, press, drier, freeness tester and Valley beater. A small Valley screen

<sup>\*</sup>Department of Chemical Engineering, University of Washington, Seattle, Washington.

### An Invitation to Industry

Come and use our laboratory, its equipment, our library, and other facilities available here at the University of Washington. They are at your disposal to assist you in solving your problems.

is used to screen the small batches of pulp produced in the rotary digesters.

Semi-Plant Equipment

• In order to increase the space available and make suitable gravity flow systems, a 5-foot balcony was placed along the other side of the room and partially across each end of the room. This serves as the operating floor for the digester and for the bleacher, and to support the storage tanks for the pulp suspension before screening. In designing the semi-plant equipment all units were made of a size comparable to the digester and to process the product in about a half hour. All equipment was constructed in the chemical engineering shop in Bagley Hall, except for the fabrication of the digester body. The digester is constructed of  $\frac{5}{16}$ -inch stainless steel plate so that either

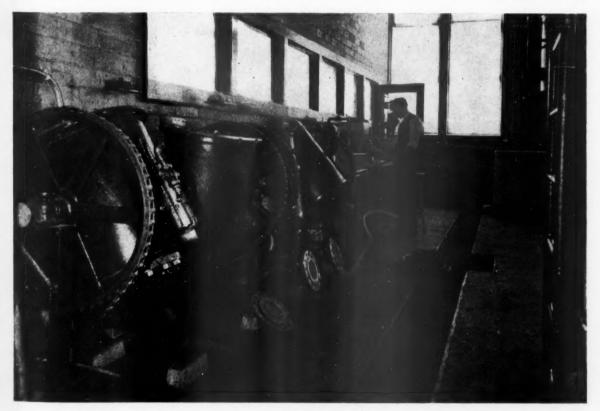
acid or alkaline pulping can be carried out. The capacity of the digester is about 8.25 cubic feet and will hold a charge of 60 pounds of chips.

Heating and circulation are carried out externally, the heat exchanger being large enough to bring the digester up to pressure within one hour. Direct steam may be used for heating with external circulation. Circulation can be made in either direction. Temperature and pressure of the digester and temperature of the hot liquor entering the digester are recorded on Taylor instruments. All parts of the digester are such that it may be used under conditions more severe than present mill practice, so that research in new processes will not be limited. The digester blows to a wooden blowpit which is connected directly to a fume duct run-

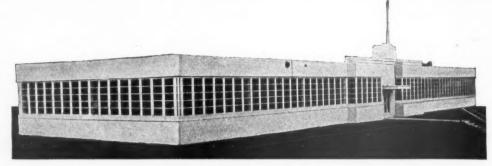


DR. KENNETH A. KOBE, Associate Professor of Chemical Engineering in charge of the semi-plant pulp laboratory.

ning to the roof of the building. A fan pulls all fumes up the duct so that the room is relatively free from gases. The waste liquor can be drained from the bottom of the



In the foreground are the four rotary digesters for small scale cooking prior to semi-plant cooking in the larger vertical digester shown in the general view \* \* \* \* In the background is the test bench containing a small beater, sheet mould and other equipment \* \* \* \* On the other side of the wall at the left is the control laboratory described in the article while at the far end the bleaching tank and the bleached stock chest shows in part \* \* \* The ladder at the extreme right leads to the balcony shown in the general view of the semi-plant pulp laboratory.



Central Technical Control and Research Laboratory at Shelton, Washington

### SENTINELS ON GUARD

The intensive vigil of our Technical Control and Research Laboratories is never relaxed. That is why we can furnish you, presently and on a continuing basis, the PULPS FOR TODAY, and assure you of the PULPS OF TOMORROW.

for Rayon for Spun Rayon (Staple Fiber)

for Cellophane
for Paper
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Better Pulps for Better Performance



EXECUTIVE OFFICES: 343 SANSOME STREET SAN FRANCISCO MILLS: SHELTON, WASHINGTON HOQUIAM, WASHINGTON PORT ANGELES, WASHINGTON TACOMA, WASHINGTON FERNANDINA, FLORIDA

SALES OFFICES: 122 EAST 42ND ST. NEW YORK CITY



The bleaching system \* \* \* \* The stock is bleached in the black tank above and washed in the chest below \* \* \* \* The cylinder containing chlorine shows from behind the chest.

blowpit and saved for further experiments, or the pulp can be washed and diluted in the blowpit before the suspension is pumped through the knotter, from which it is pumped to storage tanks on the balcony.

From the storage tanks the pulp goes to the flat screen where additional water is added. The flat screen has four Chrodon plates, 11x18 inches, and is operated by a modified Dunbar type of drive. Excellent results of high capacity with little noise have been secured. The screened pulp then goes to a washerthickener for water removal, or to a wire screen box, or to a dewatering device on the top of the bleacher, from which the pulp goes to the bleacher. Unbleached pulp may be removed and pressed into cakes. For bleaching, the pulp goes to a tile lined bleacher, in which the pulp comes in contact with only tile or rubber as all metal parts are rubber covered. The bleacher, suspended on the balcony, discharges into a wire screen box below where washing and dilution of the pulp

takes place. The pulp may be rescreened before pressing into cakes.

The construction of the semiplant equipment was made possible by grants of labor from the Works Progress Administration. Equipment manufacturers and friends of the pulp industry were generous in their support of the project through the donation or loan of equipment. The Department of Chemical Engineering wishes to take this opportunity to thank all these organizations who have so aided our project. Mr. John L. Sundling, department mechanician, performed a praiseworthy piece of work in designing and constructing a well integrated and thoroughly built pulp laboratory.

#### Control and Process Laboratories

● Adjacent to the pulp laboratory is the control laboratory (21x33 feet) and separated from it by a wall having relight windows (seen above the rotary digesters and test bench). This enables the worker at the laboratory bench to see how his equipment in the pulp laboratory is behaving. The control laboratory is equipped with regular laboratory benches and desks to which students working in the pulp laboratory may be assigned. Fume hoods, drying ovens, balances, and chemical laboratory equipment are made available here. In this laboratory the

student or research worker analyses his pulping liquor, analyses his product and carries out those control methods requiring laboratory supervision.

The process laboratory is on the other side of the control laboratory from the pulp laboratory, and likewise the wall between has relight windows for visibility. This labora-tory is 38x30 feet in size, has a large gutter in the center of the floor and all large utility lines of the pulp laboratory pass through this room. The purpose of this laboratory is to give space where special equipment for processing wood, wood derivatives, pulp, etc., may be set up, operated, modified, and work carried out on the same semi-plant scale used in the pulp laboratory. Thus, a large steam still is used by various research men in organic and pharmaceutical chemistry to separate volatile oils from leaves, stems, bark or roots for the study of these plant derivatives

Research in the unit operations of interest to the pulp and paper industry are conducted in separate laboratories. A laboratory 27x39 feet very similar to the process laboratory is used for this research. Here is being conducted the work on the equilibrium in the system CaO-SO<sub>2</sub>-H<sub>2</sub>O, absorption of sulfur dioxide in bisulfite solutions, and similar important research projects.



Samples of bleached Douglas fir sulphite pulp produced in the semi-plant pulp laboratory at the University of Washington , , , A modified sodium sulphite process was employed and a recovery system developed for regenerating the cooking liquor and recovering the sulphur.

DEPENDARITY



The strength of construction of Norton Pulpstones to withstand high loads and temperatures meets the new production requirements.

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**Invitation to Industry** 

The object of this equipment is to enable research workers to adequately and completely supply data to the pulp and paper industry. These data are of two kinds: fundamental data, both physical and chemical, on the reactions or products of the industry; and industrial data to fill an immediate want or solve a production problem. In the normal operation of a university the fundamental data are considered a more important objective, and such work is being constantly carried out. The importance of industrial data or technical methods is readily recognized. Industry frequently wants this solution immediately and wants to do the job themselves. Come and use our laboratory, its equipment, our library and other facilities available here at the University of Washington. They are at your disposal to assist you in solving your problems as well as to assist us in obtaining information of value to science and industry.

Appreciation

We wish to express our appreciation to the following firms who have donated equipment to our laboratory:

Appleton Woolen Mills, wool jacket;

Chase Brass and Copper Company, sheet brass and bolts;

Eagle Brass Company, all bronze castings;

Huntington Rubber Mills, rubber covered couch roll;

National Pipe and Tank Company, wood blowpit;

Ray Smythe, stainless steel diffuser plate;

Stebbins Engineering Corporation, tile lining in bleacher;

Taylor Instrument Company, recording pressure and temperature instruments:

Union Screen Plate Company and Chromium Corporation, Chrodon screen plates.

Thanks are also rendered to the following firms who have given substantial discounts on various items:

Allis-Chalmers Manufacturing Company,

Columbia Steel Company, Hasco Valve and Machine Com-

Olympic Steel Works, Washington Iron Works.

Ray Schadt Makes Northwest Trip

R. J. Schadt, assistant to Albert Bankus of the Crown Zellerbach Corp., came from San Francisco last month and made a trip to Port Angeles. Following his visit there he returned to Olympia for the company's technical meeting October 27 and 28, after which he returned to San Francisco.

B. C. Newsprint Mills Are Very Busy

 Newsprint mills in British Columbia are busier today than they have been in many months, due primarily to the curtailment of competition from North

Powell River Company and Pacific Mills, Ltd., are both on a six-day week basis again after a considerable period on a five-day schedule, and it is probable that they will be gradually stepped up to meet the requirements of a steadily broadening market. Production at both the Powell River and Ocean Falls mills is now practically 80 per cent of capacity.

ity.

One of the interesting developments of the past few weeks has been the inquiry from Japan. Whether this results in actual business is yet to be determined. There is a tendency to regard the Japanese attitude as little more than curiosity at this time, as it is believed that under present rigid exchange control Japan would not be in a position to make large scale purchases in Canada. However, even if the inquiries are merely in the nature of "feelers" they represent a hope-the regular quarterly dividend of \$1.25 ful development for during the past year

Japaense have not even seemed interested in the prospects of resuming their purchases from British Columbia.

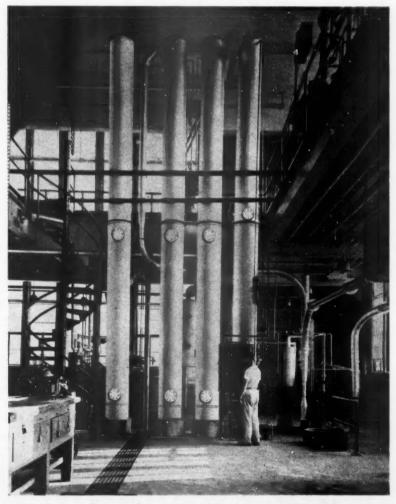
purchases from British Columbia.
So far as pulp is concerned, British Columbia producers have more reason to be more optimistic regarding the Oriental market. B. C. Pulp & Paper Company, whose two mills—at Woodfibre and Port Alice—are now in full operation, has orders for more than 3,500 tons of bleached sulphite from Japan, and additional business is expected from that quarter early in the new year.

Except for the interruption last year

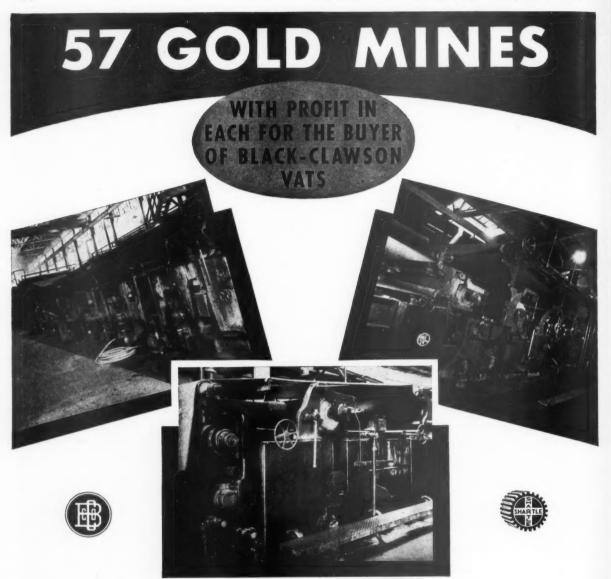
Except for the interruption last year when the company's two plants were shut down, B. C. Pulp has maintained its contract connection with Japanese buyers, although the orders have been for slightly less than before the Sino-Japanese war. Severe reduction in Japanese requirements, due to exchange restrictions, was primarily responsible for closing the B. C. Pulp plants last year.

### Crown Zellerbach Declares Preferred Dividend

On October 26th the directors of the Crown Zellerbach Corporation declared per share on the \$5 cumulative preferred stock, payable December 1st to stock of record November 13th.



The Department of Chemical Engineering's Unit Operations Laboratory in which general chemical reactions and processes are studied on a semi-plant scale / / This laboratory can be coordinated with the pulp laboratory whenever the occasion demands.



Now in successful operation are fifty-seven Black-Clawson vats of the new Uni-flo type . . . each one a gold mine of operating data. Only the Black-Clawson Uni-flo vat has undergone the acid test . . . only the Black-Clawson can furnish you the positive proof that it can control the formation of your sheet, increase tonnages, and lower felt costs.

This experience gives you four big advantages: 1) Black-Clawson can design your vat and have it work ... no theory involved. 2) Black-Clawson is tooled up to build your vat ... can do so at less cost. 3) Black-Clawson can erect your vat in less down time. 4) Black-Clawson can make adjustments and get your vat operating smoothly without further experimenting.

Why take chances on unknown quantities? Specify the Black-Clawson Uni-flo vat and profit by the lessons learned from installations in twenty mills making many grades of paper. Write for full details, without obligation. The Black-Clawson Company, Hamilton, Ohio, owners of Shartle Brothers.

Black-Clawson-Shartle

### Pomona to Install Tug Boat Annie

• Improvements in the beater room at the California Fruit Wrapping Mills at Pomona, Calif., will be started early in December. A new Tug Boat Annie, manufactured by the Shartle Brothers Machine Co. of Middletown, O., will be installed. It will have a capacity of 4,000 pounds, and will be used to supply both No. 1 and No. 2 machines. It will incorporate the new Shartle Stock Cycling System including the new cyclifiner. The system will be erected without interruption to production. Cycling chests will be built of concrete and will be tile lined. A conveyor system will be constructed to carry pulp and broke from the ground floor to the Tug Boat Annie.

### Pulp Will Dominate B. C. Forest Industries

• Pulp, which long ago exceeded in value the production of lumber in eastern Canada, will eventually dominate the forest industries of British Columbia, R. J. Filberg, manager of Comox Logging Company, predicted in addressing the Canadian Society of Forest Engineers in Victoria recently.

Mr. Filberg said that in 1922 newsprint surpassed lumber and other timber products in value, from the standpoint of all Canada, and the present trend in British Columbia was towards increased use of pulp species.

"The western hemlock, which was once the despised member of British Columbia's forest family, will be the tree of the future," forecast Mr. Filberg, recognized as one of the outstanding authorities in British Columbia on practical forestry. Last year he made an extensive tour of the forest countries of northern Europe, including Lapland and Finland. While he believes that conditions there are so different from those prevailing in the Pacific Northwest, Mr. Filberg does think that this part of the world may gain from a close study of forestry methods traditionally practiced in Sweden and other countries that have learned to regard the forest as a crop for perpetual yield.

"Forest management must go hand in hand with economics," said Mr. Filberg. "We cannot rely too much on theories and experiments, because timber is our biggest revenue maker and we cannot afford to take chances. Forestry must be made to pay its way."

Mr. Filberg maintains that in British Columbia the timber industry is rapidly adjusting itself to the use of smaller trees and will be ready, when the time comes, to concentrate on production from the young growth and species that are now neglected. He admits that the years when the industry will be based on trees from the great virgin forests of the coastal region are numbered.

"On an average, the B. C. timber industry is now using trees half the size of those handled twenty years ago," said Mr. Filberg. "It is true that the forest industries moved west from the Atlantic coast and has not returned there. But out here on the Pacific Coast the situation is different. There is nowhere else for the industry to find large trees after our forests on the Pacific Coast have been cut. We must use smaller trees, and so long as wood is needed, it will use them."

# New Paper Can Developed in Los Angeles

• Development of a hermetically sealed, moisture - proof paper can was recently announced by Paul M. Link of Los Angeles. This container combines in one package a number of desirable features that have been sought by manufacturers and users of paper and other containers.

Patents have been issued on four types of Link containers, on the opener and on the equipment necessary for its production.

The container for which widest use is anticipated is a cylindrical can with single paper top and bottom. The top and bottom are sealed to the body with a metal ring by means of a double seam, similar to that applied to tin cans. As the seamer forces the paper body out and up against the paper lid, there is a complete union of the paper, and no metal contact with the contents is possible.

By application of coatings recently developed these paper cans are made moisture-proof, resistant to oil, fruit acids and other chemically active substances. These linings are completely inert to any food product, withstand temperatures to 200 degrees F. or more, do not crack or chip. They are impregnated, rather than laminated, and form an integral bond with the paper surface.

Sealed paper cups, which may also be moisture - proofed, have been made by Link's equipment. These, as well as the cylindrical paper cans, are suitable for liquid or semi-liquid product that does not require processing by heat, in the container.

By increasing the weight of the paper stock and the width of the sealing rings, containers of any desired capacity can be made. For different uses, paper stock of any quality or weight may be used.

The containers are designed for production by standard equipment. cylinders will be made by wrapping machines, or may be cut from straight cylinder stock. Paper lids and metal sealing rings are made by standard punch press operations. Sealing is done by a double-seamer, with special seaming rolls.

As there is no metal to metal contact, and the paper sidewall is crimped to the lid, a seal is accomplished without the use of gasket material, necessary in metal cans. Where the paper container is moisture-proofed, the lining acts as a gastket to in-

sure a waterfroof seal at the ends.

The patented opener is similar to a rotary can opener and uncurls the sealing ring from the sidewalls. The inside opening remains perfectly smooth, and the lid can be used for re-capping. There is no pissibility that a sealed can could be tampered with and not immediately show this damage.

The Link paper containers are approximately one-half the weight of tin cans of equal capacity. They are sturdy for shipment and handling. These containers may be labeled like a can, or the sidewalls and lids can be directly lithographed.

### Brisbois Becomes A Member of TAPPI

 N. M. Brisbois, vice-president in charge of operations for Fibreboard Products, Incorporated, became a member of National TAPPI in July.

ber of National TAPPI in July.

Mr. Brisbois, whose headquarters are at the Stockton, California, mill, has been associated with Fibreboard for twelve years. Prior to this connection he was with the National Paper Products Company, Sutherland Paper Company, Kalamazoo Vegetable Parchment Company and the Pusey & Jones Corporation, paper machine builders, for whom he was an engineer.

### Petrie and Drysmith Attend Meeting

• James Petrie of the technical department of Pacific Mills, Ltd., at Ocean Falls, B. C., attended the technical meeting of the Crown Zellerbach Corp. at Olympia last month.

Ray Drysmith, superintendent of the Pacific Mills, Ltd., converting plant at Vancouver, B. C., also attended the technical meeting. He later came on south and spent some time at Camas and also at the Western Wax Paper Co. plant in Portland.

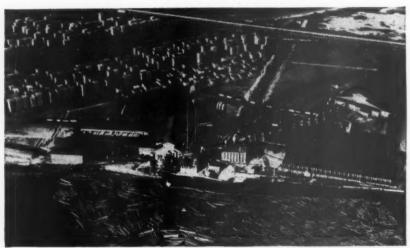
### Miss McIntosh Vacations

 Miss Evangeline McIntosh, secretary of Albert Bankus in the Portland office of the Crown Zellerbach Corp., recently returned after an extended vacation in California.

### Columbia River May Start Sawmill

● The sawmill department of the Columbia River Paper Mills at Vancouver, Washington, is being reconditioned and may resume operations the first of the year. It has been closed down since February, 1938. Factors involved in the possible reopening of the sawmill are log supplies on the Columbia River and the condition in the lumber markets. The sawmill formerly employed over a bundred men.

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Another Associated Customer—Ewauna Box Company's buge plant in Klamath Falls, Oregon, enjoys the economic advantages of Associated Service and Associated Industrial Fuels and Lubricants.

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GASOLINES · MOTOR OILS FUEL OILS

And hundreds of other petroleum products to serve specific needs



LISTEN TO ASSOCIATED FOOTBALL SPORTCASTS!

### Exports Down 40%-Imports Decline 6%

· United States exports of paper base stocks in the first eight months of 1939, valued at \$4,014,713, were 40 percent lower than the shipments in the corresponding eight months of 1938, the Forest Products Division of the Department of Commerce reported on October

The major factor in the sharp decline of exports of paper base stocks was the restriction placed by Japan on the imports of bleached sulphite wood pulp in an effort to develop its domestic industry, says the Department of Commerce.

Exports of paper and its manufactures from the United States in the first eight months of 1939 showed an 8.8 percent increase over the exports in the same period in 1938 and were valued at \$18,-

468,602.

Imports into the United States of paper base stocks in the first eight months of 1939 were valued at \$50,854,223, a 6 percent decrease from the imports in the same period in 1938. Imports of paper and its manufactures in the periods under review were 11 percent higher in 1939 than in 1938, and were valued at \$77,-Wood pulp imports, in period from January to September, 1939, were valued at \$43,564,850, while imports of newsprint paper were valued at \$70,-290,404

Most valuable item on the United States export schedule for the first eight months of 1939 was kraft container board, shipments of which were valued at \$1,436,196. Writing paper shipments were second in importance, being valued at \$1,353,133. Exports of wrapping paat \$1,353,133. Exports of wrapping paper except kraft were third in importance, amounting in value to \$1,141,965. Exports of greaseproof and waterproof paper from January to September, 1939, were valued at \$1,109,955; for the first eight months of 1939, exports of rayon and special chemical grade of pulp, led wood pulp exports with a value of \$1,256,445.

Imports of newsprint paper for the amounted to \$70,290,404 in value and constituted 90 percent of all paper imports by value. Cigarette paper, books and covers, valued at \$2,697,206 was the second most important paper item imported. Bleached sulphite wood pulp imported in the first eight months of 1939 was valued at \$14,178,240, while unbleached sulphite imported amounted to \$13,390,579. Kraft pulp imports were valued at \$9,401,005.

United States exports of newsprint pa-United States exports of newsprint pa-per in the first eight months of the cur-rent year increased 47 percent by volume over shipments in the same period a year ago, while uncoated book paper ship-ments were 74 percent above 1938. Over-issue and old newspapers exported increased 6 percent over last year, and surface coated paper shipments were up 35 percent. Other increases noted in shipments in the first eight months of 1939 included wrapping except kraft, up 3 percent; kraft wrapping, up 6 percent; tis-sue and crepe paper, up 8 percent; paper towels and napkins, up 44 percent; box-boards, up 79 percent; sheathing and building papers, up 10 percent; wall-board of paper and pulp, up 117 perboard of paper and pulp, up 117 per-cent; blotting paper, up 44 percent; filing folders and index cards, up 1 percent; papetries, up 10 percent; writing paper, up 21 percent; bags, 11 percent; boxes and cartons, 18 percent; envelopes, 19 percent; and vulcanized fiber sheets, 9

Exports of unbleached sulphite wood pulp increased 5 percent over 1938 and soda paper was up 7 percent over the same period in 1938. All other items on the wood pulp and paper export schedule showed a decrease in this period.

Imports of all classes of pulpwood except chipped, decreased in the first eight months of 1939 compared with 1938. Unbleached sulphite pulp decreased 10 percent by volume, soda pulp imports were down 32 percent, with all other pulp imports showing an increase. All items on the paper import schedule increased except printing paper other than newsprint, paper and envelope combinations, surface coated paper and hanging paper.

### Census Bureau Reports 1938 Production Down 11.3%

• The Bureau of the Census released its report on the production of paper and paperboard in the United States in 1938, late in October. The total production for the year was 11,380,814 short tons of paper and paperboard as compared with 12,837,003 short tons in 1937, a decline of 1,456,189 short tons or 11.3 per cent.

Newsprint production dropped from 975,854 tons in 1937 to 832,331 tons in 1938; Groundwood printing and specialty papers from 518,332 tons to 435,tons (this figure included hanging, tons (this figure included nanging, catalog and other grades); Uncoated book paper declined from 1,520,523 tons to 1,336,814 tons in 1938; Cover paper went down from 24,437 tons to 20,216 tons.

Writing paper from 578,147 tons in 1937 to 481,719 tons and of this total rag content papers declined from 78,367 tons to 69,465 tons, sulphite bonds from 332,229 tons to 304,282 tons, and other chemical wood pulp writing papers de-clined from 167,551 tons to 107,969

Wrapping paper totals dropped from 2,053,387 tons in 1937 to 1,865,856 tons in 1938. Of this total sulphite wrappings were down from 565,985 tons to 2,367,104 tons (but these are not strictly comparable due to changes in the Bureau's classification); kraft wrappings down from 1,130,033 tons to 1,216,030 tons (also not comparable); all other tons (also not comparable); all other wrappings declined from 357,369 tons to 282,722 tons.

The total tissue paper production in 1938 amounted to 548,943 tons an increase over the 540,152 tons produced in 1937. Of this total toilet tissue amounted to 264,380 tons last year as compared with 254,221 tons in 1937; Toweling totaled 104,951 tons in 1938 against 93,284 tons in 1937; and, all other tissues were 179,612 tons last year other tissues were 179,612 tons last year against 192,647 tons in 1937.

Absorbent papers declined from 138, 064 tons in 1937 to 126,320 tons in 1938; Building papers from 608,086 tons in 1937 to 570,454 tons in 1938; and all other papers dropped from 77,985 tons in 1937 to 58,743 tons in 1938.

All paperboard production totaled 5,103,767 tons in 1938 as compared with

5.802.036 tons in 1937.

● California's production of paper and paperboard in 1938 amounted to 242,533 tons while in 1937 the total was 278,650 tons, a decline of 36,117 tons. Oregon's 1938 production was 234,879 tons against 273,630 tons in 1937, a drop of 38,751 tons.

Washington's paper and paperboard production was 472,185 tons in 1938, but 1937 the total was 546,227 tons a

decline of 74,042 tons.

Production declined in 1938 from 1937 levels in all states listed separately by the Bureau of the Census. The Bureau states in releasing the report that,
"The schedules used in making the canvasses for the even-numbered years are less detailed than those for the oddnumbered years, and consequently some of the items in this table may not be strictly comparable as between the two

New Paper Match Firm Operating in Los Angeles

• A newcomer in the paper match manufacturing business in the west is the King ufacturing business in the west is the King Midas Match Company of 1559 Fishburn Avenue, Los Angeles. L. L. Midas, lum-berman of Chicago, Cleveland and Mil-wankee, came to the Pacific Coast in March of this year and established the new company. It occupies a modern brick factory building in the eastern industrial district of Los Angeles. The building provides about 30,000 square feet of floor space.

Unusual feature of this company's manufacturing is the high speed rotary press used in printing the match covers in multiple covers. Flatbed presses are said to be in general use for this operation. The plant makes match sticks, tips, prints covers and stitches, and packs in cartons for delivery. Clay coated papers are from the east, other paper used is bought from the Pioneer Division, The Flintkote Company in Los Angeles.

As evidence of the speed of production possible with the new equipment developed by this firm was the sale in which an order was taken May 31st for 100,000 books and delivery was made June 5. Mr. Midas is sole owner of the company. Forty-two employes are on the payroll.

### Crown Zellerbach Declares Dividend

 At a meeting on October 26th directors of Crown Zellerbach Corporation declared the regular quarterly dividend of \$1.25 per share on the \$5 cumulative preferred stock outstanding, payable De-cember 1st to stockholders of record November 13th.

### Wertheimer Home Given to Convent

· Late in October the Appleton, Wisconsin papers carried the story of the presentation of "Thilwerth," the estate of the late Monroe A. Wertheimer, at Kaukauna, to the Franciscan Sisters of Holy Family Convent at Silver Lake, Wisconsin, by Mr. and Mrs. Robert S. Wertheimer of Longview, Washington. Mr. and Mrs. Wertheimer inherited his father's home upon the elder Wertheim-

It will be used, according to the Appleton papers, as a home for invalid and superannuated sisters and later as a

novitiate.

Oscar Thilmany, founder of the Thilmany Pulp & Paper Company of Kaukauna, Wisconsin, built "Thilwerth," on the banks of the Fox River, and Mr. M. A. Wertheimer acquired it in 1900. He succeeded Mr. Thilmany as president of

the company.

R. S. Wertheimer is secretary-treasurer and resident manager of the Longview

Fibre Company.

Du Tout Dyes ne Soup Mappen

The use of color in merchandising is steadily increasing. Packages are designed from the standpoint of attractiveness, utility and serviceability. For COLORED soap wrappers, a wide range of shades may be obtained by the use of a selected group of Du Pont colors. The dyes listed are rated from good to excellent in light fastness. They are as well qualified to meet the alkali fastness requirements currently imposed by the trade as may be expected of any coloring material.

PONTAMINE\* Fast Yellow BBL
PONTAMINE Fast Yellow NNL
PONTAMINE Fast Yellow CH Concentrated
PONTAMINE Fast Scarlet 4BS
PONTAMINE Yellow CH Concentrated
PONTAMINE Fast Blue BWD

Where a wrapper should be WHITE, color is also necessary—color which will give bright whites and not be destroyed by alkali. Few, if any, UNCOLORED papers will undergo drastic alkali treatment without noticeable yellowing.

PONSOL\*Violet RRP Powder PONSOL Blue RP Triple Powder

are two dispersed anthraquinone type vat colors particularly recommended for tinting because of their outstanding fastness to light, acid, alkali and chlorine.

\*REG. U. S. PAT. OFF.



E. I. DU PONT DE NEMOURS & CO. (INC.), ORVANIC CHEMICALS DEPT., DYESTUFFS DIV. WILMINGTON, DEL

### Canadian Box Makers On Trial for Conspiracy

 Canadian paper box manufacturers have failed in an attempt to have quashed in the Ontario appeal court an indictment charging them with unlawfully conspiring or combining to restrain trade.

A motion claiming the indictment was defective in form was turned down and the trial ordered to proceed.

the trial ordered to proceed.

The companies charged are Container Materials, Ltd., Wilson Boxes, Ltd., Canadian Boxes, Ltd., Martin Paper Products, Ltd., Hilton Bros., Ltd., Maritime Paper Products, Ltd., Gair Co. of Canada, Ltd., Hindle & Dauch Paper Company of Canada, Corrugated Paper Boxes, Ltd., Hygrade Paper Products, Ltd., Martin-Hewitt Containers, Ltd., C. W. Hendershoot Corrugated Paper Company, Ltd., Shipping Containers, Ltd., Standard Paper Box, Ltd., Superior Box Company, Ltd., Acme Paper Box Company, Ltd., Acme Paper Box Company, Dominion Paper Company and Kraft Containers, Ltd.

### New Rayon Handbook Recently Issued

• The third edition of the "Rayon and Staple Fiber Handbook" by Herbert R. Mauersberger and Dr. E. W. Schwarz has recently been published by the Rayon Handbook Company of New York City. The handbook has 832 pages divided into 22 chapters and illustrated with 300 photographs, microphotographs, tables and charts. The price is \$4.50 in the U. S. and Canada and \$5.75 in foreign countries.

This is the third edition of an already well-known handbook, which has been completely revised, enlarged and brought up-to-date, deemed necessary through the continued growth of the filament rayon industry, the tremendous progress of rayon staple fiber and spun rayons as well as the increased activity in research and technical knowledge. The first two editions were titled "Rayon and Synthetic Yarn Handbook," which was changed to "Rayon and Staple Fiber Handbook" in compliance with the Federal Trade Commission Rayon Trade Practice rules. The amount of text matter of the book is double that of the first edition, published in 1934.

Two entirely new chapters were added namely: "The Manufacture of Rayon Staple Fiber and Spun Rayon Yarns" and a complete "Glossary of Rayon Terms." All other chapters have been considerably enlarged and new information added in all manufacturing subjects. These changes are so numerous that only a few of the more important ones can be mentioned. The authors have increased the number of special contributions from experts in respective and related fields such as Stanley B. Hunt, Textile Economics Bureau; H. B. Vollrath of the Viscose Process; Dr. Harold de Witt Smith on the Cellulose-Acetate Process; Theodore Wood on the Cuprammonium Process. There are also chapters written by Wm. H. Brown on Knitting, Dr. Erwin J. Saxl on Testing, C. C. Hubbard on Dry Cleaning, Geo. H. Johnson on Laundering, Leone Ann Heuer on Home and Consumer problems. a new feature.

In the dyeing, printing and finishing chapters, new developments such as inhibiting acetate fading, package dyeing of acetate, application of synthetic resins, non-slip and new anti-crease finishes are discussed in great detail. Various manufacturers have tested their dyes for the effect of the anti-crease process. Changes as to shade fastness to washing and light are recorded and this is the first time such information has ever been published anywhere. A complete line of textile chemical auxiliaries has also been added. Printing with resins and lacquers is dealt with extensively and with the advent of staple fiber and spun rayon fabrics such processes as napping, decating and shearing were included. Protomicrographs of all rayon staple fibers were made for this book exclusively by Werner Von Bergen.

All the newer fibers such as protein fibers, and the new purely synthetic fibers as "Nylon" and "Vinyon" and glass fiber have not been treated technically because their technical and commercial development has not as yet advanced far enough for inclusion in a book of this type.

ment has not as yet advanced far enough for inclusion in a book of this type.

The authors are well known and seasoned practical textile men. H. R. Mauersberger is technical editor of the leading Rayon Textile Publication, "Rayon Textile Monthly," and for the past fourteen years has been in charge of the Evening Textile Courses at Columbia University. He is a coauthor of the American Wool Handbook and a practical textile consultant and expert. Dr. E. W. K. Schwarz is well known to the trade as a textile chemist and consultant as well as former editor of technical textile publications.

• The contents of the book are logically arranged and include a complete subject index. According to the table of contents the 22 chapters deal with the following topics: Historical Background of the European and American Rayon Industry: Economic and Statistical Background; Raw Materials and their Preparation; Principal Yarn Manufacturing ation; Principal Yarn Manufacturing Processes; Manufacture of Staple Fiber and Spun Rayon Yarns; Soaking, Spooling and Throwing; Warping and Warp Sizing or Slashing; Weaving of Rayons and Spun Rayons; Commercial Rayon Grey Goods Constructions; Manufacture of Rayon Knit Goods; Dyeing of Rayon Yarns and Goods; Printing of Rayon and Acetate Fabrics; Dry Finishing and Special Processes; Physical Testing of Rayon Yarns and Staple Fiber; Chemical Tests; Methods of Identification; Dry Tests; Methods of Identification; Dry Cleaning of Rayon and Spun Rayon Ma-terials; Laundering of Washable Rayon and Spun Rayon Materials; American Trade marks and Rayon Brandnames; Rayon Yarn and Staple Fiber Producers in the U. S. and the World; Glossary of Rayon Terms; American and Foreign Literature: Subject Index.

As a whole the book serves as a complete, well-illustrated reference work on all phases of rayon production, manufacture and use for the entire textile trade as well as for the student, economist and consumer of this phenomenal new textile. The price is exceedingly moderate, compared to the wealth of information contained in this volume.

### Roy Young Visits Mill

Roy O. Young of the San Francisco office of Crown Zellerbach Corporation was in Portland the latter part of October and while here visited the company's mills at Camas and West Linn.

### Soundview Declares Common and Preferred Dividends

 Directors of the Soundview Pulp Company of Everett declared a dividend of 25 cents per share on the common stock at a meeting in San Francisco November 3rd.

vember 3rd.

The common dividend, the first since March 1, 1938, is payable on or before December 1st to stockholders of record November 15th. The regular quarterly dividend of \$1.50 per share on the 6 per cent cumulative preferred stock was also declared by the directors. It is payable November 25th to stock of record November 15th.

Soundview's earnings for nine months ending September 30th represented cumulative net profit after all charges including depreciation and Federal income taxes, of \$293,752, equivalent to 41 cent a share on the common after regular preferred dividends. This compares with \$374,351, or 57 cents per share, in the 1938 nine months period.

In September Soundview sold 13,169 short tons of pulp and reported a net profit of \$85,327 or 15 cents per share on the common, which earned 7 cents in August and 5 cents in July.

### CZ Accountants Hold Meeting

 A. L. Bennett, comptroller for Crown Zellerbach Corp. office in San Francisco, recently held a meeting of accountants from the company's various mills at Portland.

Portland.

Present at the conference were H. C. Day from Port Angeles, John N. Mulkey of San Francisco, J. G. C. Hodson from Ocean Falls, B. C., R. O. Hunt of West Linn, M. J. Van Arnam from Camas and J. D. Ollsen, chief accountant of the logging division from Cathlamet, Wn.

### Six Thousand Visitors At Camas in Eight Months

• Over six thousand people visited the large specialty paper mill of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation at Camas, Washington in the eight months from January 1st to September 1st, 1939.

The visitors came from almost every state in the union and from many foreign countries including, Australia, Tasmania, Palestine, China, Japan, France, Germany, Africa and from a number of South American countries.

"They represented all walks of life," says the Camas Post-Record in commenting upon the mill's policy of showing visitors the large plant," customers of Crown Zellerbach, paper mill executives from other states and countries, government officials, world travelers, students and probably even a few vagabonds."

The company regularly conducts visitors on a trip through the mill requiring an hour and a half.

A large number of the people visiting the Camas mill came from the surrounding territory.

Each visitor is given a booklet, "Making Paper," which lists the company's products and gives data on employment, production and payrolls.

# Agricultural Uses of Waste Liquor From Sulphite Pulp Mills

by BERNHARD T. WINIECKI\*

HE topic which your committee has chosen as an eye-opener for your convention is indeed an important one, and I feel greatly honored by the invitation to appear before you to outline briefly some of the possibilities which seem to me to exist in the field of Sulphite Waste Liquor Utilization.

Before going into this topic, permit me to bring you a short excerpt from "Appreciation" by Oliver Justin Lee, director of the Dearborn Observatory, Northwestern University. I found it in the preface to Dr. Ross Aiken Gortner's book on Biochemistry. It impressed me as a very fitting approach to his marvelous contribution to our scientific literature. Upon contemplating the import of the lines I thought, "How humbly he comes to his task" and so must we approach ours today.

I quote:

"Another world is ours, we built a stately edifice Set hard upon the solid ground of Na-

Not a building made with hands.

Nor is it finished, mayhap it never will be finished;

Mayhap it takes a hundred centuries To finish it, as in the past the craftsmen Took a hundred years to build a great cathedral.

For we ask, What is this MATTER that we see And touch and weigh and measure?

What are these forces which we use and Nature uses in her darkly hidden plans? Whence came this universe of stars and space

And nebulae and atoms that we face? How large is it? How did it start? And when?

And whither does it tend?
Is it eternal? Or
Must it come at last to nothingness?

And what is life? Is it inevitable, Given chemic elements and radiant energy

In due proportion?

"Such questions do we set ourselves to

Nothing less. And from the hard-sought answers

Build we up a structure wide as earth.
Tis not a building made with hands.
It hardly seems a building. Yet it has
Some features such as buildings have. For, here are stones in deep foundations laid

ground.

Afar in raceful arcs. And up Into the blue and purple sky of thought Extend the stately columns of accom-

searching out the structure of the Universe.

Here a stone of metric properties is put in place.

There a lowly builder turns and turns a little stone To fit into the scheme of things-and

fails-When slowly to his side come other builders

And behold—the little stone by T' alchemy of fact and thought Becomes a larger stone that fits. It

fits-It fits into the structure we are building.

Let us begin by considering the material. Sulphite waste liquor is produced when hemlock chips are digested with calcium bisulphite and sulphurous acid to produce wood pulp. It is a reddish brown liquid and in the form of digester liquor has a specific gravity of about 1.05 and contains from 10 to 12 per cent dissolved solids. These solids consist principally of calcium lignosulphonate and sugars with smaller and varying amounts of calcium acetate, calcium formate, alcohols, acetone, furfural and nitrogenous matter.

The quantity of this material produced annually amounts to approximately 716,000 tons on a dry basis for the State of Washington.

All present day schemes for the utilization of sulphite waste liquor while some are quite effective, are very limited in scope and are capable of utilizing only small quantities of this material.

As early as the summer of 1932 I started a miniature "Back to the land" movement in our approach to the problem of utilization. Since that time we have been adding a bit of evidence here and a little there until we are now convinced

that the application of sulphite waste liquor to agricultural soil has several beneficial effects.

We have, therefore, directed some of our research efforts into the field of soil conditioning. All of you know that soil conditioning has been practiced for ages by those who would be successful in making soil yield its best. Not only must fertilizer, or the plant nutrients, be replenished in the soil, but also some material must be provided for the production of humus, that very important component of the soil.

Let us turn to another phase of endeavor, involving the application of sulphite waste liquor to soil which suggested soil conditioning. work in roadway soil stabilization has progressed to the point where the State Highway Departments of Washington, Utah, Idaho, New Jersey and Maryland have used sulphite waste liquor as a material for construction. Tests on base stabilization are now in progress in Washington and Utah. In our work with these soils we have found that the lignin fraction of sulphite waste liquor solids remains in the soil over long periods of time when the soil is compacted to its point of maximum density. In roadway soils and aggregates, the microbial population is small and when the soil is compacted the voids are greatly reduced, consequently water and air are excluded thereby preventing decomposition of the material.

Now in the case of agricultural soils, the situation is exactly the opp site. Plowing prevents composition and tends to aerate the soil and increase the voids. All these conditions are conducive to microbiological activity provided a food material is supplied.

During our extraction studies on soils treated with Raylig or sulphite waste liquor, our attention was directed to some preliminary work on

"We have in our state huge sources of lignin com-

pounds which, through further study and experi-And only pebbles show above the mentation, may be made useful for the production of humus to enrich our farm lands not only to provide increased production, but also to protect them against the costly losses by wind and water erosion."

There, from other deeps as firmly set Rise giant towers flinging graceful buttresses

<sup>\*</sup>Rayonier Incorporated, Shelton, Washington. Presented at the Washington State Chemurgic Conference, Seattle, Washington, November 4,

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plants in 1932 and 1933. In these early tests, although they were of a qualitative nature, we found that sulphite waste liquor applied to garden soil in the proper manner had a remarkably stimulating effect on plant growth. We reasoned that the sulphite waste liquor solids, which in themselves are not a complete plant nutrient, do, however, give rise to a chain of biological and biochemical reactions which over a long period of time actually produce materials that are beneficial not only to plants during growth, but also contribute to the improvement of the physico-chemical properties of the soil.

From the constituents of the liquor as given you a few moments ago, let us see what happens when sulphite waste liquor is applied to soil: First, any free sulphur dioxide is dissipated by reaction with soil air and the adsorptive and neutralizing media present there. Next, the fermentation of the sugars and fermentable hemi-celluloses is accomplished by bacteria. And finally, the slow breakdown of the complex

lignin compounds by the action of molds and the higher forms of soil micro-organisms follows.

These various phases have been studied by several other investigators and their results bear out our observations in this field. While these studies to date have dealt more particularly with the effect of the material on plants, it is my belief that more specific attention should be given to the changes which can be brought about in the soil itself. That is, what happens to the structure, the tillability, the water-holding capacity, and the plant food liberating capacity of soil upon treatment with sulphite waste liquor? At the present time our answer is, "All these are improved to a certain degree."

• The behavior of soil treated with sulphite waste liquor and allowed to react for a year shows the same results as the other soil conditioning practices which contribute to the increase of the humus building substances in the soil. Gentlemen, we have in our state huge sources of lignin compounds which through further study and experimentation may be made useful for the production of humus to enrich our farm lands not only to provide increased production, but also to protect them against the costly losses by wind and water erosion.

In conclusion, let me state that I have studiously avoided giving you statistics, analytical reports, or references to the literature as the time was too short for the development of details.

As time goes on, we hope to develop further useful information and perhaps evolve a soil conditioning treatment of great practical use.

Also, let me say to you, that our Raylig Research organization will welcome an opportunity to assist the staff of the Regional Agricultural Research Laboratory in its soil problems, particularly by the production of various types of sulphite waste liquor and also modified forms of the same for use in their experiments should any work of this nature be undertaken.

### Pomona Enlarges Laboratory

• A recent remodeling job at the California Fruit Wrapping Mills at Pomona, Calif., has supplied Superintendent Charles G. Frampton with a fine new office and the testers with new quarters in the laboratory. Along with the other improvements was the remodeling also of the humidifying room.

### Herbert W. Server Dies in Cloquet

• Herbert W. Server, Sr., superintendent of the Northwest Paper Company, Cloquet, Minnestona, died in that city on October 18th at the age of 66.

Mr. Server was the father of Charles Server of Olympia, Washington, Pacific Coast representative of the Appleton Woolen Mills of Appleton, Wisconsin.

Born in West Carrollton, Ohio, Mr. Server entered the paper business there, and at the time he left for Cloquet he was superintendent of the Oxford-Miami Paper Company.

Surviving are his wife, another son, Herbert, Jr., and four daughters, and two sisters.

### Death Takes Mrs. Frampton's Mother

• Mrs. Annie Myers, mother-in-law of Charles Frampton, superintendent of the California Fruit Wrapping Mills of Pomona, Calif., passed away the latter part of October. Mrs. Myers was a native of The Dalles, Ore., and had spent a large part of her life in the Northwest. She is survived by two sons and a daughter.

### Walter Smith Develops A New Flat Screen

 Walter G. E. Smith of Portland, Oregon, well known in the pulp and paper industry on the West Coast, has developed a new type flat screen after two years of study and experimentation.
 Mr. Smith's flat screen has three prin-

Mr. Smith's flat screen has three principal features which differentiate it from the conventional type. Instead of depending upon the pumping action of the diaphragm to force the screened stock over the dam boards and into the flow box, Mr. Smith has utilized gravity by applying a siphon to remove the stock from the diaphragm chamber. As installed on a screen, this siphon spout is substituted for the ordinary flow box and is attached to the screen vat at the ususal outlet on a level with the diaphragms.

The effect of the siphon in drawing the stock from the diaphragm chamber immediately after it has passed through the screen slots is to greatly increase the capacity of the screen while at the same time reducing the power required to operate it. Twenty-four of these siphons were installed on old Harmon type flat screens in a Pacific Coast mill more than six months ago and have doubled their

original capacity.

Mr. Smith's second departure from present design is in the drive. He has developed a pulsator, as he terms it, for each diaphragm. Briefly it consists of a pair of counter weighted gears enclosed in an oil tight housing directly attached to the conventional diaphragm plate. These gears are so meshed that the counterweights oppose or balance each other except at the top or bottom of their orbits at which points they are in harmony, their combined force producing the slight vertical movement either up or down as the weights alternately arrive at the high or low points of their respective orbits.

As the stroke is governed solely by the speed and the combined forces generated by the counterweights it responds readily to the variable conditions constantly encountered. Should the plates be more or less sealed, the resistance offered to the down or draw stroke, results in a consequent shortening of the stroke and a floating action of the diaphragm. No excessive draw can be applied by the pulsating mechanism. As the siphonic action is constant and sufficient, actually no down stroke would be necessary on screens equipped with the siphon spout and it is therefore highly desirable that the mechanical down stroke be as mild as possible.

Each pulsator element is flexibly connected to a common line shaft drive through a V-belt.

The combination of the siphon and the pulsator have brought about changes in the structural design of the flat screen. The new frame is simpler than the frames of the screens now in use, Mr. Smith states.

An experimental four plate screen embodying the siphon, the pulsator and the new frame design has been tested in another Pacific Coast mill for approximately a year.

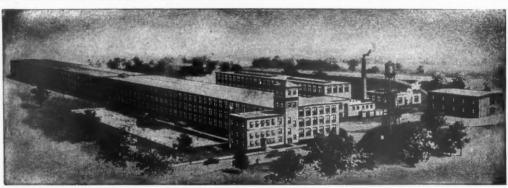
A third mill has ordered a fourteen plate screen built in accordance with the data developed from Mr. Smith's tests and including the siphon and the pulsator drive. This commercial unit will be installed some time in December.

Either the siphon or the pulsator or both may be installed on any screen now operating, and will give, Mr. Smith says, greater capacity and all around improved operation. From his series of experiments and tests he is convinced that only through a combination of the two can the greatest capacity and efficiency be obtained.

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ALBANY, NEW YORK

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### One Hundred Years Ago In the British Paper Industry

• The paper industry in Great Britain was not without its governmental super-vision and taxes a hundred years ago, writes Charles Greenhalgh in The World's Paper Trade Review, published in London. The data on the production of paper in those days and the excise taxes imposed by the government are interesting in the light of conditions today. Quoting:

"July 19th, 1839, was the date of the Paper Duty Consolidation Act. "One hundred years ago. What a change has taken place since that time! When this Act came into force the paper manufactured in the United Kingdom was made from rags, cotton and linen, flax waste, hessians, old cordage and ropes. Wood pulp and esparto grass as paper making materials were unknown and only a small amount of straw was

"All writing papers were hand made. It was only about 35 years before this time that the Fourdrinier machine was invented and those that were in operation were engaged in the manufacture of news, printing and coarser types, such as wrappings.

"There was no paper imported, except some engraving or drawing paper, and a certain amount of paper hangings, or Long Elephants as they were then known. These were imported from France. All the other paper used in the U.K. was of home manufacture.

### "Ingenious and Beautiful Machine"

"The paper machine a century ago was regarded—in a description at that time—as 'one of the most ingenious and beautiful in the whole range of mechanical invention.' Is this not true of the fast-running machine today, running, as it does, so gracefully and swiftly, adored by the men who attend it, instilling into them the feeling that there is something to be proud of in being a paper maker.

"Another record states: 'Notwithstanding the unrivalled quality of British paper, and our possession of many ad-vantages as to capital, and improved machinery, the exportations which, including stationery of all kinds, amounted in 1840 to £282,403, are nearly confined to our own colonies and foreign dependencies. Except some printing paper to America, very little is sent elsewhere, a circumstance attributable to the fact that the manufacture, requiring no great capital, is pursued in most foreign countries, who generally impose heavy duties upon the introduction of all papers which compete with their own.

#### License and Excise Levies

"At the date which has been mentioned, it is interesting to note that there were 512 paper mills in the United Kingdom, whereof 411 were in England, 47 in Scotland and 54 in Ireland. Each of these had to pay a license of £4 per annum. An excise on paper was first levied in Britain in 1711 which, after many fluctuations, was fixed in 1803 3d. per lb. on first-class paper and 1½d. per lb. on second class made of old cordage and ropes only.' In Ireland the cordage and ropes only.' In Ireland the duties first levied in 1798 (by a license on the engine, according to the size of the vat) were assimilated to the preceding duties in 1824. The high duty on the first class, and the inconveniences, evasions and frauds, attending the other regulation, were long the subject of comregulation, were long the subject of com-

plaint; at length, on the recommenda-tion of the Fourteenth Report of the Commissioners of Excise Enquiry, the duty was imposed at a uniform rate of 1½d. per lb. on all classes after October 10th, 1836. In 1835 the quantity charged with duty was: in England, 64,-899,901 lbs.; in Scotland, 12,015,059 185,; in Ireland, 2,702,352 lbs.; total 76,617,312 lbs., the net produce of duty being £796,305. But in 1841, the quantity charged was in England 76,292,724 lbs.; in Scotland 16,821,354 lbs.; in Ireland 16,821,354 lbs.; in Ire land 3,991,472 lbs.; total 97,105,550 lbs.; yielding net duty £587,380, the quantity having increased 22 per cent., while the revenue fell 26 per cent.

### **Provisions of Consolidating Act**

"The provision of the Act of July 19th, 1839, was a duty of classes of paper and pasteboards made in the United Kingdom, but with drawbacks on certain papers, such as those used for Bibles, Prayer Books, or books in Latin, Greek or Oriental languages within the universities; also, amongst others, account books exported as mer-

"Paper making premises were liable to be entered at Excise and inspected by officers. Any persons intending to export had to give 12 hours' notice to Excise and to specify time and place, etc.; the officers had to weigh and take account of same.

#### Penalties for Offences

"Should any device be used to hinder or deceive an officer from taking a true or deceive an officer from taking a true account of package, there was a penalty of forfeit of such package and £200. There were other penalties of £100 to £200 for certain offences. So the paper maker had to watch his ps. and qs. when dealing with the officers of the Crown one hundred years ago.

"The amount of paper reported alone for Ireland seems small when consider-ing the number of mills reported as being in existence, but it is more than probable that many of these were not in operation or had not the power to keep working many hours per week. Of course, the tonnage mentioned is only that on which duty had been paid; there must have been a quantity which had been subject to drawback, but the figures now given will probably be interesting, showing, as they do, facts relating to the past history of paper manufacturing in the U.K."

### **British Mills Concentrating** on "Black-Out" Papers

 Says "The World's Paper Trade Review" for September 1st, "There has been a great rush for 'black-out' paper as for other materials required for A. R. P. (Air Raid Precautions). When the crisis reached almost its height during the last week-end, stocks of black paper were exhausted, and wholesalers spent hours telephoning to Manchester and other pro-vincial mills asking for emergency supplies to be sent by passenger train.

"Inquiries of four leading paper manufacturers showed that it would take three or four weeks to satisfy all the orders that were received on the Thursday morning alone for special A. R. P. black paper. one largely in demand is non-inflammable, damp and water-proof, pliable and unaffected by acids. It is sold in rolls eight yards long and three feet wide."

### **State Department Announces** Plans for Agreement With Chile

· A reciprocal trade agreement with Chile is the next to be undertaken by half of American industry were to be submitted by November 11th and hearings are scheduled to start November 27th. Warren B. Bullock, manager of the Import Committee of the American Paper Industry has announced that it will prepare a brief for the paper industry as has been done in the case of previous agreements.

An effort will be made, Mr. Bullock states, to secure such modifications in the Chilean tariff procedure as may facilitate exports of American paper to Chile.

### Accident Shows Practical Value of First Aid Work

• The value of the safety and first-aid work done in the industry and of the training given the men who work in the mills and logging camps can be definitely seen in the improving records of the mills and camps. However, ever so often the value is more vividly demonstrated by the training enabling workers in the industry to rescue or assist others who are entirely without the scope of their ordinary activities.

A striking example of this occurred on Friday afternoon, August 4, when Jack Barnes, 21-year-old employe of the Siltcoos logging operations of the Crown Willamette Paper Co., Division of Crown Zellerbach Corporation, saved the life of Clifford Harvey in Lake Siltcoos near Reedsport, Ore.

Harvey, a newcomer to Siltcoos, attempted to swim the lake with a friend, Martin Kiesow of the Tillamook Spruce Veneer Co., and suffered severe cramps when 100 feet from a diving float. ing to his aid Kiesow was badly clawed by the drowning man and was forced to give up and swim to safety. Harvey sank in 10 feet of water. Working in the company office 200 feet from the lake, Jack Barnes heard the cries and ran to the rescue. After diving four times he finally located the body and brought it to the surface. Time being precious he swam to a stiff boom, lifted Harvey onto it and applied artificial respiration. Five minutes later Harvey was revived and now suffers no ill effects.

Barnes credits his ability to saving Harvey's life with elementary first-aid studied in the Boy Scouts, and advanced first-aid instruction given in the Crown Willamette logging operation at Siltcoos by company first-aid instructors.

This is another instance where employees of Crown Zellerbach Corporation, who have been trained in first-aid have been able to save the lives of people not connected with the organization. There have been numerous other instances where members of first-aid teams from pulp and paper mills and logging camps have applied first-aid to motorists injured on the highway.

# Industrial Uses of Waste Liquor From Sulfite Pulp Mills

by A. J. BAILEY\*

NE of the world's outstanding biochemists recently told me that in my lifetime I would see paper, a primary product for 2000 years, overshadowed in importance by byproducts until it was itself a byproduct. That statement may seem visionary at first, but recent industrial developments in Wisconsin offer an insight into a new chapter about to be written in the chemistry of wood. Probably the most striking facts about this progress in Wisconsin are the capture of almost half of the domestic market for vanillin and the reduction in the price of vanillin from \$3.75 per pound to \$2.10 in three years. But the real significance lies deeper.

The preceding paper<sup>6</sup> has given us an insight into the progress made in the State of Washington in the use of sulfite waste liquor, the greatest industrial waste in the world. I want to tell you about another operation leading in the technology of sulfite waste liquor. Together these two plants probably represent the highest peaks of progress in this field on this continent, if not any

The plant I propose to discuss is that of the Marathon Paper Mills Co. at Rothschild, Wisconsin, which it was recently my privilege to visit. The pulp section of the plant has a capacity of 110 tons of pulp per 24 hours and is a standard sulfite operation generally similar to any of our fourteen sulfite mills in

Washington.

continent.

The outstanding feature of the operation is the recovery of organic material from the waste liquor for conversion into useful commodities. The usual practice of running this waste liquor into sewers and waterways results in throwing away half of the tree, since more than half of the original wood is dissolved in the waste liquor. This half of the tree which is dissolved in the liquor is about 50% lignin, a complex organic material, and about 50% simple sugars. The Marathon plant can recover 90-95% of the lignin from the waste liquor, thus ultimately throwing away only a quarter of the tree.

• The basis of the recovery process is the precipitation of the lignin with lime<sup>3</sup>, filtering off the lignin, and using it in three general ways. The first of these uses part of the lignin in the production af vanillin. The second method incorporates the unreacted lignin from the vanillin process into a variety of plastic materials. The third way employs lignin in substantially the same form in which it was precipitated, for tanning leather, in softening water, as fuel, and similar purposes.

To describe the process in more detail, departure from the usual process begins when the waste liquor is pumped to storage tanks having a capacity equivalent to a 24-hour production of waste liquor, in this case 110,000 gallons. Serving in a dual capacity as a reservoir and to equalize variations in liquor composition, the waste liquor is fed to a three-stage lime precipitation, milk of lime being added in each stage. The first precipitation recovers calcium sulfite for reuse in making the cooking liquor. The second stage separates the lignin as a basic salt calcium ligno-sulfonate. The third stage removes the final amount of inorganic material which is taken back to the first stage for reuse as a precipitating agent. Each stage has its reaction tank, a suitable settling tank of the Dorr type, and the appropriate piping and pumps to transport the various materials.

The second stage which recovers the lignin is the one which interests us most. One of the chief problems is the separation of the lignin from the enormous amount of water. For each pound of lignin which the process recovers, eleven pounds of liquor must be processed. Most of the liquid is removed from the process in the settling tank since only the slurry which collects at the bottom of the tank is removed and filtered on a rotary vacuum drum filter. The lignin is scraped continuously off of this drum filter as a

thick brown sludge or mudlike material containing 65-70% water and it is this sludge which is used for tanning agents, vanillin, and plastics.

Complete processing of 110,000 gallons of waste liquor should result, with 90% recovery, in about 65 tons of lignin, i.e., a lignin production of 65 tons per 24 hours. About 7 tons of lignin per day are processed with caustic soda for vanillin. The vanillin is extracted from solution with a solvent and purified. The yield of vanillin is in the vicinity of several per cent which means that 95% of the lignin is not used up, but is available for further use. This unrecated lignin is cooked with fresh chips, the chips are pulped and formed into sheets. Pressing these sheets at an elevated temperature results in a dark brown board-like plastic which has good strength and water resistance2. These boards can be made in a variety of thicknesses depending upon the number of sheets pressed. The Marathon Company now supplies rolls of material ready for laminating into core sheets and is developing surface sheets which are identical to the core sheets except that the surface is modified by resins. Molding compositions for positive, injection, and impact molding and modified lignin resins for coating, impregnating, and adhesives are now in semi-commercial production1.

Another portion of the filtered lignin sludge, the amount depending upon market demand, is treated by appropriate chemicals and dried. The dried material roughly resembles granulated rosin in apperance and comprises the calcium, magnesium, and sodium salts, or the free acid, depending upon the chemical treatment. Sacked for shipment, it is available in carload lots and finds use as a tanning agent, a water softener, a cement curing agent, a

"Chemically, the possibilities of this lignin waste product are almost unlimited. The next few decades will undoubtedly see a large number of products made from this waste with new industries emerging in successful operation."

<sup>\*</sup>Assistant professor of chemistry, Department of Chemistry and Chemical Engineering, University of Washington, Seattle. Presented before The Washington State Chemurgic Conference, Seattle, Washington, November 4, 1939.

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dispersing agent, a grinding aid, and similar uses.

The final portion of the lignin sludge from the processed liquor is pressed in a tractor type press to remove more moisture yielding a pressed cake containing approximately 50% moisture which has been successfully burned over long periods with the admixture of 10% coal screenings in a standard water tube boiler with an overall heat efficiency of about 70%5.

This definite, tangible progress in the utilization of sulfite waste liquor, much of it on a plant scale over a period of three years, represents a constructive step forward and one which is highly indicative of the real potentialities of the waste liquor. A classic parallel exists in the utilization of coal tar which was thrown away as a nuisance about a century ago and now is the raw material from which thousands of products are obtained and which even supports entire industries, such as the dye industry. The industrial development which has already occurred at Shelton and in Wisconsin, together with certain natural and geographic advantages offer very convincing evidence that exceptional progress will be made in the Pacific Northwest.

• In abundance, lignin is the second most abundant organic material in the world, cellulose being first. The absolute quantity available is infinitely large, far in excess of coal or oil since lignin is a constituent of all higher plants and dependent only on plant growth. Practically about half of the wood pulped is dissolved in the liquor, and about half of the dissolved material is lignin. If the fourteen sulfite mills in Washington recovered the lignin in their waste liquor, it would amount to about 1400 tons per 24 hours or almost 60 tons per hour. Stated differently, Washington's production of lignin made into Eversharp lead would reach almost to the moon, or as a piece of spaghetti would encircle the earth six times, or a weight equivalent to fifteen of our largest battleships each year.

In two of our largest pulp regions in the United States, in two independent plants, carload lots of lignin are available in proved industrial operations. For the first time, quantities adequate for research, experimentation, development, and industrial sustenance are provided. Chemists may now work with tons of material if necessary, rather than small amounts tediously gleaned in the laboratory. The production of vanillin is merely the first step in a long list of products.

One hears much these days of water polluted by sulfite waste liquor. The Wisconsin operation has shown a decrease of 80% in the biological oxygen demand of the processed liquor. Thus another irritating feature may be removed by the processing of the waste liquor, with the additional possibility of conversion of the carbohydrates still in the liquor by formentation processes.

• Chemically, the possibilities of this lignin waste product are almost unlimited. The next few decades will undoubtedly see a large number of products made from this waste with new industries emerging in successful operation. To me, the most interesting fact about the Marathon operation is not that vanillin can economically be made from lignin, not that one plant can satisfy all of our domestic needs for vanillin, but that 95% of the lignin processed is still essentially unused. The real significance and challenge in the Marathon operation is that our best use of lignin lies ahead.

In conclusion, I hope this brief discussion has made possible an appraisal of the background and a glimpse at the possibilities in the use of lignin from sulfite waste liquor. Make no mistake, there are real problems ahead, problems that will require management with vision and funds that will put our best chemists and engineers to work at the task. But the stage is all set for the real drama. We have the raw material, we have some products made from lignin, and we have the encouragement of success in similar line of chemical research. Now we need only the actual activity to open new vistas of industrial development. In my opinion, many of us in this room will live to see paper become a byproduct.

#### Acknowledgement

The author desires to express his indebtedness to Guy C. Howard of the Marathon Paper Mills Co. for his kindness and courtesy in demonstrating the achievements in lignin technology at Rothschild.

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#### Sidney Roofing to Sell Masonite in B. C.

■ Sidney Roofing & Paper Company, with factory at Victoria, B. C., has been appointed British Columbia distributor for Masonite products of International Fibreboard, Ltd., Canadian distributors for the Masointe Corporation. The agency will be divided with Vancouver Lumber Company in Vancouver.

#### **Hodson Visits** In States

 J. G. C. Hodson of Pacific Mills, Ltd., at Ocean Falls, B. C., came to Portland the week of October 23, and then went on to San Francisco on a business trip.

Stebbins Offers Useful **Engineering Booklet** 

 A booklet published by the Stebbins Engineering Corporation of 1201 Textile Tower, Seattle, will be extremely useful to plant engineers and superintendents in the pulp and paper industry using small or large cylindrical tanks for either stor-

or large cylindrical tanks for either storage or processing purposes.

A table showing the capacities of cylindrical, vertical tanks occupies one full page. Diameters from 1 ft. 10 in. to 100 ft. 0 in. are listed in one column, the cubic feet capacity, and the gallon capacity—in both U. S. gallons and also in Imperial gallons—appear in adjacent columns.

Tables of circles—from 1 in diameter to 100 ft. 0 in.—occupy seven pages and should prove particularly valuable, as should prove particularly valuable, as they cover the complete range of sizes in feet and inches, by inches. The circumference and the area in square feet for every diameter are also given, thus anyone can see at a glance that a vessel 61 ft. 11 in. in diameter has a circumference of 194.52 feet and an area of 3010.96 square feet.

One table shows the volume and area of spheres of different diameters listed by fractions from 1/32 in. to 3 15/16 in. and gives their respective volumes (in

and gives their respective volumes (in cubic feet) and areas (in square feet). Another table covers spheres from 4 ft. 0 in. diameter to 50 ft. 0 in. being listed by feet and inches. Yet another table is devoted to decimals of an inch and a foot giving the decimals of fractions from 1/16 ft. and 1/6 in. to 12 ft, and

Altogether, this book of tables con-tains considerable information in handy form and its use should save much trou-blesome figuring for anyone having oc-casion to deal with the capacities, cir-cumferences, areas, etc., of vessels and tanks. A copy can be obtained free on application to the Stebbins Engineering Corporation, 1201 Textile Tower, Seattle, Washington

Washington.

# Quality SULPHITE PULP

PUGET SOUND PULP&TIMBER COMPANY BELLINGHAM, WASH.

DOMESTIC & EXPORT

# The Harcraft Towel Dispenser-A Method of Merchandising

Some 50,000 Harcraft towel dispensers have been installed in the western states since 1935 using Longview Fibre Company's kraft toweling-Manufacturers of dispenser have recently developed wire tying and paper cut machines.

 Observing the trend several years ago from linen to paper toweling for use in offices, factories, restrooms and wherever continuous linen supply service was needed, the Harvey Machine Company of Los Angeles decided to develop a new method of dispensing paper towels which would be effective and economical.

The result of the firm's research was the development of the Harcraft Cabinet, first manufactured for the trade in 1935. Rather than considering the device a towel dispenser only, the company regards it, according to Lawrence A. Harvey, vice-president and sales manager, a method of merchandising. It was seen by the company that anything given away is wasted, that if a man has to expend some effort, regardless how slight, to get what is given free, he will be more saving, and that the average user of a free towel, for example, is impatient to get at it.

The Harcraft Cabinet solved these problems. It limited the amount used by requiring the user to make a manual effort to obtain the towel, an effort which kept him busy for the moment while waiting, and so avoid impatience. The result is that one-third the paper is used to dry hands and face as had been pre-viously required. Controlled delivery was the feature attained. No cranks, no push bottons, but a manual action by the user, and completely sanitary were features of the new device. The Harcraft Cabinet has now put the sale of paper towels out of the price class and into the performance class.

The company gives the cabinets away. Paper used is made by the Longview Fibre Company of Longview Washington, in the west, and the Southern Kraft Corporation in the east. A good 32 pound kraft of high wet strength and dry strength of high absorption quality, crimped and lintless, is used. It is packaged 7,500 towels to the carton and is the 131/2" x 81/4" standard junior underfolded towel

The distribution of the cabinets and towels is through Blake, Moffitt & Towne in the west and through the accepted paper merchant outlets of the east. More than 50,000 cabinets are in use in the western area.

A short time ago Harcraft, Ltd., was established in London, Great Britain, to make cabinets and distribute towels in the British market. Longview supplies the paper, which is sent through Harcraft Co. of Los Angeles. The cabinets are given away in England, as in this country. Despite the tariff, the item moves with a good pace and shows substantial profit.

#### **Introduce New Machines**

The Harcraft Company, affiliate of the Harvey Machine Company, recently introduced two new machines of interest to the paper industry. They are a wire tying machine which automatically wire ties bundles such as pulp bales, and a paper cup manufacturing machine.

The wire tying machines is fully automatic. It takes off a reel of wire, wraps it around the bundle, applies, tension, twists the wire into a tie, cuts off the ends and re-loads the machine for the next operation. It will handle 13 to 18 gauge wire.

The cup machine makes fluted, single piece roll bead, flat bottom cups in one phase, an operation which is said to be equaled by one

other machine on the market, a multiple machine requiring more than one phase for the operation. The Harcraft device is one-fifth the size of similar machine and is reported to make cups at from 15 to 20 per cent lower cost than competitive mechanisms.

Five of the units are in operation at the Harcraft Co. plant supplying cups for paper merchant outlets for coast consumption. No others are in

operation elsewhere.

Officers of the company are L. M. Harvey, president; L. A. Harvey, vice-president and sales manager; B. W. Weingart, vice-president. Los Angeles plant is located at 6200 Avalon Blvd.

Colton Attends **Everett Sales Meeting** 

Milton Colton, assistant sales manager, printing paper department, Zeller-bach Paper Co., San Francisco division, accompanied by Mrs. Colton, spent a week visiting the mill of the Everett Pulp & Paper Co., Everett, Wash.

#### Everett Issues New Broadside

A very handsome broadside on Vul-can Plate, featuring baseball, was sent out last month by Blake, Moffitt & Towne, San Francisco. Vulcan Plate is manufactured by the Everett Pulp & Paper Co., Everett, Wash.

#### **Davis Joins Sidney Roofing in Vancouver**

• P. W. Field, manager of Sidney Roofing & Paper Company in Vancouver, B. C., announces that Jack H. Davis has joined his staff to take charge of Mason-

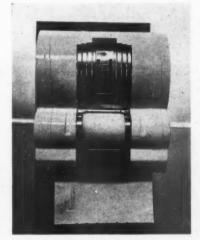
**Bulkley, Dunton Open** Office in Kalamazoo

• The Bulkley, Dunton Pulp Company of New York opened a branch office in Kalamazoo, Michigan, on November 1st, in line with its policy of rendering the best possible service to paper makers in the important manufacturing centers.

Milton R. Bailey is in charge of the Kalamazoo office and is associated with Rex Vincent, Bulkley, Dunton's Chicago representative in serving the paper industry in the middle west.

Bulkley, Dunton Pulp Company is one

of the principal suppliers of domestic and foreign wood pulp and represents several Pacific Coast producers. The company was established in 1833.



THE HARCRAFT TOWEL DISPENSER

The user pushes the roll upward until it stops, then down until full towel

# Talk Trade

of Those Who Sell Paper in the Western States

#### J. W. Kelly Resigns From General Paper

• J. W. Kelly, for a number of years connected with the San Francisco and Los Angeles paper jobbing house, General Paper Co., and for the past 11 months manager of the San Francisco branch of the company, has announced his resignation from the concern as of December 1, 1939.

Kelly stated that he was not ready to announce his plans for the future at the present time. No successor for his post has been announced yet.

#### **BM&T** Employees **Hold Big Pienic**

● More than 200 employees of the Los Angeles division, Blake Moffitt & Towne,

Angeles division, Blake Mothit & Towne, large Pacific Coast paper jobbing house, enjoyed an outing at Brookside Park, Pasadena, Sept. 23.

W. W. Huelat, manager of the Los Angeles, and Southern California division of the company, relied on William G. Kullick, who acted as general chairman of the event, to see that things rolled along smoothly.

During the morning there was a golf tournament, tennis matches, and a base-ball game between the "Coateds" and ball game be the "Nullines.

At 1 p.m. the hungry throng swooped down on the eats like a paper salesman reaching for his order book. From two until four there was a big program of bean guessing contests, peanut races, 50 and 100-yard dashes, balloon bursting contests, throwing contests, paper races, tug of war, sack races, needle threading contests, scissor races, cracker eating con

test, three legged race, and other events.

The final feature of the program was a baseball game between the "Bonds" a baseball game between the and the "Walsh Strings."

#### Dallam Joins Pacific Coast Paper Co.

. W. F. Dallam, for a number of years, the San Francisco representative of the Fernstrom Paper Co., Pomona, Califor-nia, has resigned that connection to be-come affiliated with the news print sales department of the Pacific Coast Paper Co., San Francisco.

Mrs. M. Buchan, formerly Dallam's assistant, has been appointed to manage the Fernstrom Paper Co.'s San Francisco

#### Canadian Kraft Prices Higher

 Pacific Mills, Ltd., British Columbia subsidiary of Crown Zellerbach Corporation, is receiving slightly higher prices for its kraft production, but the advance has not been so great on this coast as in the east, where some companies report quotations up as high as \$20 a ton.

The company enjoys an extensive export trade in kraft, selling to South Africa and South America as well as in markets closer home. Company officials estimate that the increase in price since the war has been approximately \$5 a ton, although the general trend of world markets indicates that there may be a further boost before long.

### Bergman of Lilly-Tulip Attends Exposition

 Howard Bergman, sales representative of the Lily-Tulip Company of New York was in San Francisco during the recent Dairy Industries Exposition. While there he made his headquarters at the office of Plass Webb, San Francisco, reprepresentative of Lily-Tulip and at the Zellerbach Paper Company, distributors of the line.

#### Southland Company Acquires A. C. Abbott Plant

Acquires A. C. Abbott Plant

The Southland Paper Converting Co.
was organized early in November to take
over the A. C. Abbott Products Co. in
Los Angeles. The former company operated in the Los Angeles area for ten
years. Mr. A. C. Abbott, the founder
and head of the company passed away
in June. The company will maintain
production and sales headquarters at 747
Warehouse St., the site of the older company.

Ray Sterling, formerly assistant to the wrapping paper sales manager of the Zellerbach Corp. in Los Angeles, is manager and part owner of the new firm.

For the present the company will con-

tinue along the same lines as its predecessor adding new lines in the near fu-ture. Mattress bags, carpet padding and sanitary paper slippers are the chief lines of the firm now. They plan to add large paper bags to this group immediately.

#### Zellerbach Service Pins

 Employees of the Zellerbach Paper Co., who were awarded service pins dur-ing October, included the following: Portland division, Arthur A. Allen, 35 years; Oakland division, L. J. Broadwater, 25 years; San Francisco division, John Connoly, 20 years; and Spokane division, W. J. Boyel, 20 years.

#### Zellerbach Club **Holds Big Dance**

 "A fine time was had by all," was the verdict of those attending the big dance of the Zellerbach Recreation Club, at the Fairmont Hotel, San Francisco, Oct. 21. Most of the Northern Cali-fornia divisions of the company were represented.

More than 200 employees of the Los Angeles Division of BLAKE, MOFFITT & TOWNE and their families enjoyed an outing at Brookside Park, Pasadena, on September 23rd.



#### BM&T Hold Sales Meeting

All districts served by Blake, Moshitt & Towne, San Francisco paper wholesalers were represented at a meeting October 23rd of the sales managers of the

tober 23rd of the sales managers of the various divisions.

The meeting lasted four days, and among those in attendance were: R. Lyle Simpson, printing paper sales manager, Los Angeles; R. R. Whiteman, sales manager, wrapping paper dept., Los Angeles; A. Z. Sherrig, sales manager printing cancel dept. ing paper department, Portland; P. C. Macdonald, sales manager, wrapping paper department, Portland; L. P. Chapman, sales manager, printing department, Seattle; J. C. Whitelaw, sales manager ment, Seattle; J. C. Whiteiam, sundager, wrapping paper department, Seattle; L. V. Hall, sales manager of both Jacobs Tacoma; Arthur W. Towne, Northern California manager; O. W. Mielke, general manager; James Gruner, San Francisco sales manager, printing paper department; and L. C. Conner, San Francisco sales manager, wrapping paper department.

paper department.
On the third day of the session all Northern California branch managers were called into the meeting. These included: F. L. Unthank, Oakland; L. H. Leatherman, Sacramento; B. M. Hoblick, Fresno; L. M. Heath, Stockton, and F. L. Willson, San Jose.
During the evening time was levely

P. L. Willson, San Jose.

During the evening time was largely spent at the Exposition, those in attendance enjoying dinner one night at the Yerba Buena Club, later going in a group to the Follies.

#### Fox River Men Visit Jobbers

E. A. Oberweiser, president, and R. F. Bellack, vice-president of the Fox River Paper Corp., Appleton, Wis., were visiting their many friends on the Coast last month.

#### Southen of Kalamazoo On Coast

· A. Southen, vice-president and general sales manager of the Kalamazoo Vegetable Parchment Co., Parchment, Mich., was a Pacific Coast visitor last

#### **Gruners Vacation**

• J. A. Gruner, printing paper department sales manager, Blake, Moffitt & Towne, San Francisco, and Mrs. Gruner enjoyed a two weeks vacation in Southern California.

#### **British Columbia Newsprint** Situation Much Improved

 British Columbia newsprint mills are sharing in a general improvement being enjoyed by the industry throughout Can-ada. Higher prices in England, a new ada. Fligher prices in England, a new Mexican contract reputedly for 100,000 tons and heavier October shipments were factors in the better feeling reported, although B. C. operators were not directly influenced by the first two items.

All the Mexican business went to east-ern Canadian mills. As a matter of fact, the Pacific coast mills—Powell River and Pacific Mills—were not particularly in-terested in the contract, having enough orders of their own with regular customers

The Mexican order, however, is regarded as significant inasmuch as it marks the first definite diversion of business formerly handled by Germany. It may lead to orders being given to Cana-dian mills, including west coast plants, from Central and South American countries, which are likely to be cut off from their normal source of supply in Scandinavia and the Baltic countries.

· News from England was that the controlled price of newsprint in the United Kingdom had been advanced to £17 or The reason for the increase was inability to get requirements met by was inability to get requirements met by Norway, Sweden and Finland. This new figure represents an advance of more than 50 per cent over the previous quo-tation set by the controller. However, the actual cost to consumers has not climbed as much as might be indicated, inasmuch as the old price was £12 5 shillings plus war costs. Shipping, insurance and other items made the cost consumer much higher than the listed price. The new price does not affect contract prices on Canadian shipments to England, although there is always the possibility that Canadian shippers might invoke the war clause and adjust prices to compensate them for higher shipping and insurance charges.

Production and shipments in October were much higher than a year ago, and there is no indication so far of excessive hoarding.

 Eastern Canadian mills doing business with the Hearst organization had addi-tional reason for jubilation this month when it was announced that Hearst would pay cash for current deliveries of news-print supplied by Canadian plants. For

shipments of Canadian newsprint to Hearst papers in October, payment was to be made in cash on the 25th of the month, and November shipments will be paid for at the corresponding date. This is in striking contrast to the previous policy of paying in term and demand notes extending for four months or even

Anglo-Canadian, Consolidated, Lake St. John, Brompton, are among the manufacturers to benefit from the new policy. The Hearst organization is reported to owe \$10,500,000 to Canadian companies for newsprint delivered.

#### **Kraft Paper Prices Move Upward**

• Reports from New York indicate the continued steady climb of kraft paper prices from their low point of last sumprices from their low point of last summer. Several large kraft wrapping paper producers late in October raised the price to \$80 per ton. This is an advance of \$5 per ton from the previous price set in September, and represents a total advance of nearly \$21 per ton from last summer's low price. The price quoted in midsummer, says the Wall Street Journal in reporting the kraft paper price rises, was \$65, but discounts and concessions in some cases brought the actual sions in some cases brought the actual selling price down to less than \$60 per ton. After the outbreak of the European war, the price was raised to \$67.50 and the concessions were eliminated.

In a short time the price of kraft wrappings rose to \$72.50, to \$75 and now to \$80, the level at which it sold during the period of heavy demand in

It is reported that not all concerns are quoting an \$80 price as some have no surplus to sell and are not quoting prices. The price of kraft board is said to be

staying at \$45 per ton which has been the price since last April. Consumers of kraft board are said to be endeavoring to get the producers to quote firm prices for the first quarter of 1940, but pro-ducers are waiting until December as they feel it is now impossible to estimate with any degree of accuracy the extent of their own increases in costs

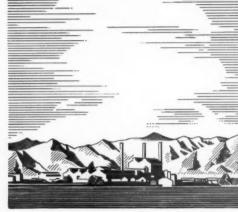
It is believed that stocks of kraft board have not been built up by the first buyers, the box manufacturers. Consumers of kraft shipping containers are thought to be building up moderate stocks to them over any periods when daily de-liveries from the box companies might

not be possible.



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ers, the printers.

The advertisement goes on to say, The advertisement goes on to say, "You had probably intended to sit on the shelf' but the Sweet Young Thing in the box office acts as though there wasn't a balcony in the theatre. "'Loge or Orchestra?' she queries. Your best girl is alongside—there are four people behind you, so you compromise with your pocketbook and say, 'Orchestra.'

chestra.

"The show proves good, the girl is pleased, and before you leave the thea-tre you've probably decided that the few

tre you've probably decided that the few cents difference paid for the better seats was money well spent.

"It is that way with Book Paper, too. Your customer may have intended using New England Gloss, but if you ask, "Which do you prefer, Lustro or Cumberland Gloss?" he'll probably choose Cumberland and be mighty pleased with his judgment when he sees how the better stock has enhanced the effectiveness of the printed matter." of the printed matter.





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REDDY KILOWATT.

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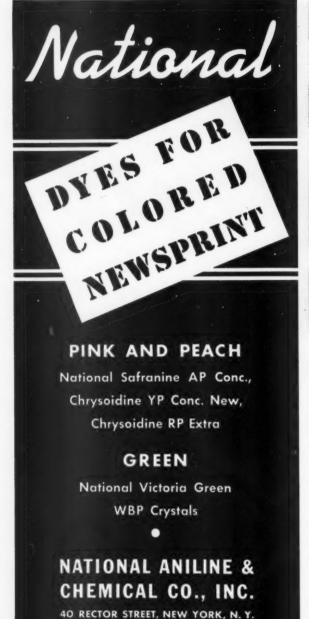
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"Non-Users Are the Losers"



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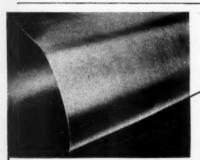


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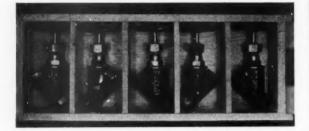
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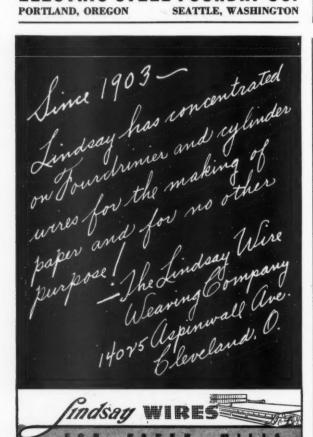
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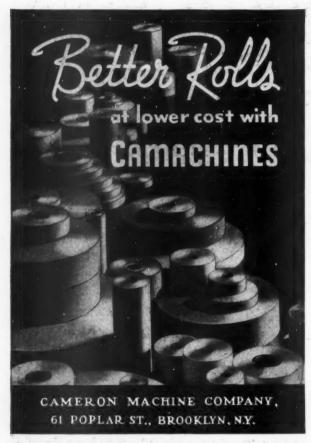
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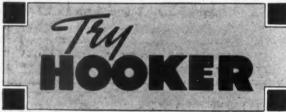


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This Taylor Pressure Recorder is economical to buy. It can be installed on all types and makes of Jordans. And, mills report that it's surprisingly quick to pay for itself.

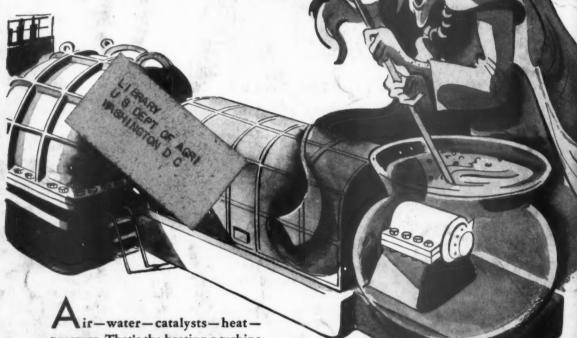
Let a Taylor representative give you more facts about Jordan plug pressure control. There's no obligation. Address: Taylor Instrument Companies, Rochester, N.Y. Plant also in Toronto, Canada. Manufacturers in Great Britain: Short & Mason, Ltd., London, England.

Pacific Coast Sales Offices:—145 Mission St., San Francisco, Cal., and Central Bldg., Los Angeles. Also Terminal Sales Bldg., Portland, Ore. Repair facilities for all Taylor Instruments are available in San Francisco. For your protection, have adjustments or repairs to Taylor Instruments made by Taylor.









Air—water—catalysts—heat—pressure. That's the beating a turbine oil must take. To build a product that can stand such treatment at all is an accomplishment. But to put the proper grade in service, check it and watch it, and keep it in service for months and years until it pays for its cost, is the job Shell undertakes.

First there's the oil itself: Shell Turbo Oil. Research and refining, tied in with the experience of turbine builders and users, have produced an oil of unusual stability.

Next, Shell realizes operating variables require that even the finest oil be given every chance to succeed.

Hence Shell has created a staff of experienced engineers—thoroughly capable of giving real help, not their mere presence, to turbine manufacturers and users.

And the Shell product and plan are working. We have enjoyed a substantial increase in business and gained the confidence of technical staffs in this field from coast to coast.



SHELL TURBO OIL